Second language reading instruction:
a study of an awareness-raising reading course in an agriculture college in Portugal

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APPENDIXES

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APPENDIX 1

Excerpts from lesson transcripts, interviews, questionnaires and observer's notes with original quotations in Portuguese

Chapter 2

Page 14
'No que diz respeito à pergunta 10 [i.e. Gostaria de acrescentar algum(ns) comentário(s) acerca da leitura?']: Actualmente recomendo poucos livros em inglês devido ao facto de os alunos manifestarem dificuldade e desinteresse nesses livros. Refira-se que este facto ocorre apesar de na biblioteca da ESACB estarem disponíveis publicações de grande interesse para as matérias leccionadas' (Pre-CQ L5: Q26).

Page 14
'[...] a minha formação em inglês, e é importante, se calhar, referir isso, é bastante reduzida, *tive apenas três anos de inglês*, do sétimo ao nono e sempre com aproveitamento negativo. ((Riso)) Portanto, de forma alguma sou uma pessoa exemplar neste... neste... tanto assim que fui sempre muito mais francófono do que anglófono e gosto muito mais de francês, obviamente do que inglês, em termos da língua, em termos da cultura tenho uma ligação maior com esse tipo de países mas... portanto *devido um bocado à obrigação que eu tive de ler inglês, inicialmente do ponto de vista técnico ou científico, acabei por ter, sem ter estas bases sólidas, ou minimamente sólidas, para conseguir ler,* consigo ler e ouvir, e consigo perceber bem o inglês, mesmo a nível oral aah... [...]' (Int. L5: Q2.4 – my emphasis).

Page 22

(1a) 'Acho que é um *gap* muito grande que eu tenho de não gostar de ler e de não ler tanto como devia' (Int. L10 Q2.1 – my emphasis).

(1b) '[...] aqueles [artigos de jornais] que realmente me interessam e que acabo por ler, leio assim um bocadinho na diagonal e pronto é uma preocupação que eu tenho é manter-me informado do que é que se passa: quem morre quem nasce, os resultados desportivos, os *rallies* e essas coisas todas que me interessam, a política nacional, os grandes conflitos mundiais nas ex-colónias, etc., não é? É isso... (Int. L6: Q1.2 – my emphasis).

(1c) 'Também a *Internet*, hoje em dia também já se consulta a *Internet* e temos textos em inglês, principalmente em inglês, é o que aparece mais' (Int. S18: Q1.4 – my emphasis).

(1d) 'Não, não... A estrutura dos textos é quase *standard*, não é? ((Riso))' (Int. S4: Q3.4 – my emphasis).

Page 23
'Como não existe uma tradução para português manteve-se o termo original. *Stakeholder* pode ser definido como indivíduo ou grupo de indivíduos cujas vidas ou ambiente são afectados por um determinado projecto' (5HW L13 – my emphasis).

Page 30
'É claro que... quando tenho colegas que não lêem em inglês [e temos de fazer um trabalho de grupo] tenho que ser eu a ler em inglês, não é? ((Riso))' and '[quando é necessário ler em inglês] tenho colegas que começam logo a reclamar...' (Int. S5: Q2.1, Q2.2).

Chapter 3

Page 62
'De um modo geral os livros/artigos existentes nos serviços de documentação da ESACB são solicitados aos serviços pelos docentes' (Pre-CQ L2: Q26).

Chapter 5

Page 114
'Os nossos alunos vêm muitas vezes com listas de bibliografia indicada pelo professor e, normalmente dessas listas constam livros em inglês. Não se pode dizer que adorem, mas, mesmo assim consultam e, por vezes duplicam partes que lhes interessam' (personal communication by email 12.11.1999).

Page 114
'Os artigos científicos dos quais dispomos em grande número, raramente saem dos seus locais de arrumação/depósito. [...] Algumas [revistas] são em língua inglesa o que as torna, à partida para alguns [alunos], perfeitamente inacessíveis [...] os nossos alunos procuram revistas, mormente em português ou espanhol. Verifica-se a mesma tendência. Pelo menos até agora, só em vésperas de estágio é que se percorre todo o fundo em busca de artigos' (personal communication by email 12.11.1999).

Page 123
'As aulas obedecem a um padrão previamente estruturado e explicado aos alunos, daí que todos conheçam os objectivos de cada exercício e saibam qual o procedimento a seguir.

Esta metodologia parece facilitar a abordagem de textos nem sempre fáceis de perceber e que, tanto graficamente, como estruturalmente, se revelam compactos e pouco penetráveis com uma primeira leitura' (Obs.N. GC).

Page 123
'A explicação mais ou menos teórica sobre os aspectos estruturais da língua escolhidos para núcleo de cada sessão, embora pudessem tornar-se maçadores para um público não linguista, foi feita numa linguagem clara e acessível, com um ritmo certo, nem demasiado rápido nem monocórdico, o que permitiu que as explicações fossem captadas. A profundidade das matérias, no entanto, obriga a reflexão posterior' (Obs.N. GC).

Page 125
'Lê sempre os textos do mesmo modo ou usa diferentes estratégias dependendo do texto? Pode dar um exemplo?

Não... eu penso que os textos em inglês eu penso que leio se forem artigos científicos ou artigos técnicos leio sempre da mesma forma. Leio assim por alto primeiro e depois vejo onde 'tão as partes que interessam e *então aí faço um resumozinho em português*' (Int. S9: Q2.13 – my emphasis).

Page 126

(1a) 'O tempo despendido a ler artigos *sobre matérias muito específicas de áreas muito distintas da do nosso trabalho e que, portanto, não nos dizem nada.* [...] A leitura torna-se mesmo fastidiosa' (Post-CQ L9: Q6 – my emphasis).

(1b) '[O que achei menos útil no curso foi...] a leitura de textos de áreas que cientificamente nada tinham a ver som os meus conhecimentos. Estou a referir-me fundamentalmente aos textos científicos muito específicos. Todos aqueles que tinham a ver com a cultura geral foram até muito interessantes' (Post-CQ L4: Q7).

(1c) 'Tenho pena que a maioria dos textos do curso tenham sido relativos a temas relacionados com Produção Animal, o tornou o curso um pouco "pesado" alguns dias' (Post-CQ S14: Q7).

Page 128

'Esta metodologia parece facilitar a abordagem *de textos nem sempre fáceis de perceber e que, tanto graficamente, como estruturalmente, se revelam compactos e pouco penetráveis com uma primeira leitura*' ((Obs.N. GC – my emphasis).

Chapter 6

Page 141

'[As conferências, colóquios e seminários] consistem na análise e discussão participadas, de uma ou várias propostas, previamente apresentadas, sobre um tema ou vários temas afins' (*Regulamento Interno da Escola Superior Agrária* 1999/2000: 4)

Page 150

(1a) 'Voluntariam-se para fazer as correcções. Quando a correcção é solicitada directamente a um dos elementos do grupo, todos se mostraram atentos e corrigiram prontamente uma resposta errada. Durante a explicação teórica todos se mostraram envolvidos e participavam activamente nas respostas, tendo mesmo sido colocada uma pergunta em inglês e que se referia a uma situação que se enquadrava perfeitamente no contexto' (4Obs.N. LL2).

(1b) 'Revelam já um certo à vontade na aula, pois usam a língua inglesa para tecer comentários sobre algum barulho que se ouvia no rés-do-chão. Também os comentários acerca da correcção do exercício 7A são feitos em inglês. Mesmo algumas piadas oportunas são feitas em inglês' (7Obs.N. LL1).

Page 150

'Muitos docentes trouxeram de casa um texto para fazer 7B-3. A correcção desta actividade foi muito participativa e animada. Há discordância de interpretação, primeiro apresentada em inglês e depois em português' (7Obs.N. LL1).

Page 151

'Os docentes sentam-se individualmente [as mesas são para duas pessoas], bastante separados. [...] No exercício de *pair work* (4B-2), apenas se forma um par. Dois outros docentes juntam pontualmente esforços' (4Obs.N. LL1).

Page 151

T		How is it going? ((low voice))
	→	But it is in pairs you have to do it together!
L16		*Eu sei.*
L5/L16		*Mas é que eu já fiz e estou a ver se ela- / Mas ela já fez.* ((L16 laughs))
L5		((L5 laughs))*Tem que ser não é? A ver se ela-* ((L5 laughs)) *chega lá.*
T	→	((T laughs)) So you can help a little bit that's the idea of working in pairs.
L5		*A gente já vê* ((L5 and L16 laugh))

(4Transc. LL1)

Page 152

L16?		*Isto dá para fazer em trabalho de grupo?*
L		((unint))
L4	→	*Vamos aqui copiar!* ((T and L4 laugh))
L5	→	*(Vê se chegas a casa e estudas)*
L4		((unint))
T		Yes you can use the words in the list.
L4		*Pois sim... tem que ser* ((T and L4 laugh))
		((LL are completing task B2 and discussing possible answers; L coughs))
L5		Problem ((very low voice))
L4		Problem ((very low voice))
T		Okay the first one is already done ((T and L4 laugh))
L4	→	*Oh que chatice!* ((L4 laughs))
		Por isso é eu estava a ler esta tão bem ((L4 laughs))

(4Transc. LL1)

Page 152

		[L9 suggests an answer to a question]
L9		Likely to have (carried)
T		Yes they were likely to have carried.
L9		Likely... to have.
L10		Probably have carried *se calhar é melhor do que* likely.
T		No... Why don't you like the word likely and unlikely which are so often used in English ((T laughs))?
L3	→	It is not very likeable word.
T		Yes it's not very likeable ((T laughs))
L5		She likes probably.
T		You prefer probably and and okay so it's your person-

L10	560	((unint)) ((LL and T laugh))

(7Transc. LL1)

Page 153

(2a) 'Todos se mostraram muito concentrados, pedindo com frequência (pelo menos 8 vezes) explicações sobre o significado de palavras no texto 4A-1. [...] Mostram interesse permanente e conversam entre si para tentar resolver os problemas' (4Obs.N. SS1)

(2b) 'Mostram concentração na leitura e participam activamente na correcção do exercício 7B-1, fazendo muitas sugestões. [...] O trabalho de pares revela profunda colaboração. Estão embrenhados e vão trocando ideias' (7Obs.N. SS2)

Page 154

T		Yes this is <trend> okay?
		Now the next exercise you can do it in pairs in groups of two okay?
S16		*Este?*
T		Yes.
S18	→ 455	*A professora quer fazer comigo?* ((S18 laughs))
SS/T		((SS/T laugh))
T		Okay you can do in groups of three you have two three... I don't think I am good pair in this situation ((T laughs))

(4Transc. SS2)

Page 155

(3a) 'Felicitá-la por ter reunido toda uma série de temas bastante importantes e que vão para além do conteúdo normal, aprendizível nas aulas. *Também por ter tido a iniciativa de interagir com os alunos e por nos fazer sentir bastante úteis por colaborar num trabalho desta ordem.* Obrigado por tudo o que ensinou! Parabéns e felicidades para o futuro...' (Post-CQ S2: Q7 – my emphasis).

(3b) '*Espero que a minha participação tenha sido útil* e boa sorte na sua tese de doutoramento' Post-CQ S6: Q7 – my emphasis).

Page 156

(4a) 'Quer dizer eu sempre vi o inglês muito nesta perspectiva de: "O que é que eu posso tirar daqui em termos informativos?"' (Int. L5: Q3.1)

(4b) '[...] este uso da língua que nós fazemos neste momento que, no fundo, acaba por ser um uso interesseiro não é? Em função das, das nossas necessidades... enfim para a nossa vida profissional' (Int. L6: Q3.1).

(4c) 'Eu acho que as pessoas lêem, e sobretudo lêem em inglês quando a língua é... oficial é o português, não é? Lêem quase por necessidade, muitas vezes, porque têm de fazer os seus trabalhos, [...] as pessoas vão aprendendo por obrigação, por necessidade, por imposição das coisas que aparecem no dia-a-dia. Não é muitas vezes por gosto, essa é a minha opinião. A leitura, muitas vezes, não é por gosto, há excepções, obviamente, não é? ((Riso)) Aah... por isso...' (Int. S4: Q3.5).

Page 156
'A motivação dos alunos é certamente grande para ser possível manter o ritmo de trabalho proposto. A motivação é mantida não apenas pelo compromisso de quem se inscreveu voluntariamente num curso de leitura, mas, sobretudo pelo reconhecimento da utilidade de perceber os mecanismos estruturantes do discurso científico, de que são exemplos os aspectos linguísticos escolhidos para cada uma das sessões' (Obs.N. GC).

Page 160
'As dúvidas são colocadas tanto em português como em inglês, mas a resposta é sempre dada em inglês' (Obs.N. GC).

Page 166

S1? →	*Professora o que é que quer dizer* <features>?
T	<Features>? It's in a way characteristics ((SS laugh)) things that belong to something.
S4? →	Teacher? ((unint)) <features>

(4Transc. SS2)

Page 168

T	[...] L9 have you got this page... the Answer Sheet?
L9	No.
T	No? Okay.
	No?
	Yes you have two there ((T and LL laugh)) Oh!
L9 →	Not possible! *(francamente)* ((LL laugh))
T	I thought I had given one to each person ((T laughs))
L9 /L10 →	*Eu olho para o lado* ((unint)) / ((LL laugh)) / ((unint)) *então é?*

(7Transc. LL1)

Page 168

T	On page two… here. Page two exercise two. Okay? Okay you have an expe- imagine- you have to imagine you have to imagine you have an experiment to <compare the digestibility of five concentrate ingredients in cattle and sheep>… okay? These are the ingredients you have… You don't need to-
L9 →	*Lá vêm os* sheep ((T laughs))

(7Transc. LL1)

Page 168

T	You don't need to tell me the context you can have only the-
L3 →	*Ah é? (Então fixe)*

(7Transc. LL1)

Page 169

T	Yes you see ((T laughs)) you can say the same thing ((T and LL laugh)) ((unint)) just changing one or two words you can change completely-
L8 →	*Eu empresto-te uma caneta vermelha para pôr aí muito bom.* ((T and LL laugh))

(7Transc. LL1)

Page 170

During Activities A

S →	*O que é que quer dizer* committed? ((very low voice))
T	Committed means that you are very much sure about your own ideas okay? It's the opposite of tentative [...] ((very low voice))

(7Transc. SS2)

Page 170

During Activities A

S6? →	*Posso pôr... o início e reticências até ao fim?*
T	It is easier for me if you write it all.
S6?	Okay.
T	Okay because it is easier for me to find them.
S6?	Okay.

(4Transc. SS1)

Page 170
During Activities B

L17	→	*Na primeira nós temos que temos que ter a certezas que as coisas correram bem não é?*
T		And in the other one you don't want to co- compromise so much. You want to show a little bit more distance towards your results.
L10		*Isto é para fazer uma frase curta não é?*
T		Yes you don't need to write much.

(7Transc. LL1)

Page 173

T		So the first... thing I would like you to have a look is... you have two sentences in a box... and the two sentences say exactly the same thing but one is taken from a textbook and the other one is taken from a research article. I'd like you to read them and to tell me which one you think is from a textbook and which one is from a research article.
		((LL read the two examples))
L10		*O segundo é o é o da da* research.
T	→	Yes and why do you think so?
L		(The textbook is) the first.
L10		*Pela maneira de escrever* ((L10 laughs)) *não.*

(7Transc. LL1)

Pages 174-175

T	I	Okay and for number three? <this is not true>.
L2	R	Could not... *é o menos-*
L14	R	Could not be.
T	F	Yes.
L2	→ I	*Menos* committed *e o* do not *é mesmo...* commitment
T	R	Yes. And we are changing-
L2	→ I	*Então como é que eu vou mudar? O que aqui está que é do not que é uma coisa que... é mesmo assim para* could not?
T	R	Because... in the original text it was not <do not benefit>.
L2	→ I	*Então-*
T	R	This is an exercise okay?
L2	F	*Mas então eu não sei o que está no texto original porque então isto não tem nada a ver com o grau de comprometimento digamos assim*
	→ I	*desculpa lá Isabel eu assim não consigo adivinhar não é?*
T	R	*Mas não é para adivinhar é para sugerir expressões ou palavras*

		que-
L2	**R**	*Que de alguma forma tenham o mesmo grau-*
T	**F**	*Não não é que tenha o* ***mesmo*** *é que tenha menos... o exercício o exercício é para tirar... esse grau de... certeza digamos é para suavizar o texto-*
L2	→ **I**	*Mas eu não estou a perceber esta aula desculpa lá.*
L12		*Eu estou na mesma hoje* ((L12 laughs)).
L2	→ **I**	*Porque os* hedges *pelo que eu percebi são expressões... que fazem de facto a modulação do texto mas que nos dão ideia se há comprometimento ou se não há... e portanto temos desde o ponto máximo de comprometimento.*
T	**R**	*Sim mas quand-*
L2	**R**	*que é a pessoa de facto estar de concordar com aquilo ou não estar de facto quer dizer saber-*
T	**F**	*Não o ponto máximo- é assim o* hedging *é quando já não há um ponto máximo de comprometimento quando já não 'tas completamente seguro.*
L2	→ **I**	*Pronto mas então aqui* [L2 is pointing to the tables in the handout] *deste da certeza até à incerteza.*
L15/L2	**R**	*O* will *não é um* hedging? / *portanto isto-*
T	**R**	*O* will *já não é não é um* hedging *é o ponto de certeza e depois começas à medida que vais descendo digamos aí nessa lista vais modulando é sempre porque se tu dizes demonstra estás a dizer a certeza absoluta isto não é* hedging.
L12	**F**	*Tá bem* ((L12 laughs))
L2	→ **I**	*O* hedging *é um conjunto de expressões que nos auxilia a perceber o grau de comprometimento de* commitment *com o que o escritor escreveu não é? Para conseguirmos saber o grau então a certeza não entra no* hedging?
T	**R/F**	*Não.*
		Porque o hedging *estás a modular aquilo a... o texto... se eu disser* the results show *aqui não tenho* hedging *se eu disser* the results may show *aqui já tenho* hedging.
L2	→ **I**	*Pois então era isso que eu não estava perceber aqui não 'tá-*
T	**R**	*Não este texto-*
L2	→ **I**	*Não posso modificar uma coisa que tenho a certeza por uma coisa que eu não tenho a certeza.*
T	**R**	*Não este texto- isto é um exercício não é? Portanto isto nunca acontece na vida real. O exercício é assim o texto estava tinha modulação... eu tirei-lha eu alterei o texto.*
L2	**F**	*Pois...*
T	**I**	*Portanto eu agora não quero que adivinhem o que é que lá estava... eu quero que transformem essa frase ou essa expressão numa forma*

		em que introduzam hedging *a frase não tem e eu quero uma alternativa agora aqui obviamente nós não estamos a ver o sentido do texto no... vocês não podem adivinhar o que é que lá estava não é? Não é para isso o exercício é só p'a ser capaz de pegar numa coisa que está certa... e transformá-la ou p'a ser mais... aah... portanto p'a mostrar mais respeito*
L2	→ **I**	*À nossa vontade?*
T	**R**	*Exactamente.*
LL	**F**	*Pois.*

(7Transc. LL2)

Chapter 7

Page 180
'O contacto com a língua inglesa' (Post-CQ S11: Q5).

Page 193

(2c) 'Que diferentes textos têm diferentes conteúdo logo diferentes objectivos e públicos alvo, esta distinção é de fácil observação através da estrutura dos textos' (1FBQ S3: Q6).

(2d) 'No caso desta sessão, os tópicos não são novos, estão é muitas vezes adormecidos pela nossa própria inércia em ler mais em inglês. Outras vezes são novos só do ponto de vista de não darmos mais atenção ao valor das várias frases ou excertos de um texto de um livro ou artigo' (1FBQ S4: Q7).

(2e) 'Quando tiver que estudar por livros académicos ou textos científicos já sei como está estruturado o que me ajuda a ganhar tempo e a ir directa ao assunto' (1FBQ S15: Q6).

Page 194

	Warm-up task	**Follow-up task**
(3a)	'É um ensaio sobre o armazenamento da batata' (1A-1.2: L10).	⇒ 'Research article' (1-C 2.2: L10)
(3b)	'Texto de agricultura sobre batatas, e o efeito de produtos químicos na sua produção' (1A-1.2: L11).	⇒ 'Research article' (1C-2.2: L11)

(3c)	'Trata-se de um relatório de uma experiência ou trabalho de investigação' (1A-1.2: S6).	⇒ 'Artigo científico (research article)' (1C-2.2: S6)
(3d)	É um texto de relatório de um estudo realizado (1A-1.2: S8)	⇒ 'Research article' (1C-2.2: S8)
(3e)	Texto específico em agricultura (1A-1.2: S16)	⇒ 'Artigo científico' (1C-2.2: S16)
(3f)	Texto científico que descreve uma experiência (1A-1.2: S19).	⇒ 'Research article' (1C-2.2: S19)

Page 202

S11	→	846	*E* <between> *também não é?*
T			<Between> *é entre*. It's a preposition okay?
S11			*Pois.*

(4Transc. SS1)

Page 202

T			If you want to see this in more detail we can see this after okay?
	→	1020	((Talking to S20)) Not these ones. This is a verb. *Isto é pode resultar pode resultar pode resultar.* Okay? It's not. And here this word could be but it doesn't refer you to another part of the text so in this case it's **not**... it's not a discourse structuring word.

(4Transc. SS1)

Page 203

S			*A seguir a* <disadvantage>.
T			After what? Sorry?
S			<Disadvantage>.
T		435	Okay... <disadvantage>...<doubt> when you are not sure about something.
S	→		*Uma dúvida?*
T			Yes.

(4Transc. SS1)

Page 203

L12		*Aah então 'tava bem. Obrigada.* <Mis-in-ter-preta-tion>.
T	285	Okay let us see. What is interpretation?
L15		*Aah interpretação.*
T		Okay when you add the the prefix **mis-** in English it means always something done in a bad way... So if do a misinterpretation-

L12? ((unint))
T No means interpret it in the wrong way you didn't interpret it well.
LL ((unint))
L14 (Like) <misjudgement>
T Like <misjudgement> it means you did not judge in the correct way you-
L ((unint))
T In the wrong way okay?
L12? → *(Mmm... como é que se diz?)* ((low voice))
T You don't have a word in Portuguese okay?
L12 → ((unint)) opposite.
T No it's not the opposite.
L14 → *Má interpretação.*
T Yes it's a bad one... It's always something you do bad- if your child when [child's name] doesn't behave properly ((L12 laughs)) he **mis**behaves ((LL laugh)) he behaves in the wrong way in the way he shouldn't okay?
L12 Okay.
(4Transc. LL2)

Page 204
S1? <In- inference>?
T <Inference>? *É uma inferência.*
S1? → *O que é uma inferência?* ((S1? laughs))
[explanation in English by T]
(4Transc. SS2)

Page 209
'Gostaria que nalguns tópicos ter tido mais tempo para interiorizar melhor os conceitos e conseguir com maior eficiência (compreender) ler e escrever nessas "matérias". Ex. tópicos nº 5 [noun chains] nº 6 [nominal style] nº 7 [hedging]' (Post-CQ L2: Q7).

Page 211
(9b) 'Prestar mais atenção ao nível do envolvimento dos autores com os resultados apresentados' (6FBQ L6: Q6).

(9c) 'Para podermos saber qual a interpretação do autor em relação a outros artigos' (6FBQ S11: Q5).

Page 211-212

(10b) 'A encontrar com maior rapidez o assunto sobre o qual o autor escreve (efectivamente)' (9FBQ L8: Q6).

(10c) 'Localizar a ideia geral e o tema dos textos com mais facilidade' (9FBQ S13: Q6)

Page 214

'Se for, por exemplo em inglês, o manual vou... tenho o dicionário ao pé, vou risc... fazendo bolinhas nas palavras que não entendo e vou fazendo... vou vendo ao dicionário e depois, por exemplo, *se eu não perceber um parágrafo sou capaz de o escrever palavra a palavra e depois reorganizar a frase para conseguir tirar o sentido à... ao texto, à frase.* [...] *Sublinho, faço uma bolinha à fr... nas palavras que eu não entendo e depois vou ver ao dicionário e tento reorganizar a frase, mais ou menos, para conseguir entender. Por vezes, não consigo entender só assim a ler*' (Int. S1: Q2.13 – my emphasis).

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(11a) '[O que achei menos útil no curso foi...] ... os tpc... é sempre complicado ler algo que é difícil de ler por si só, ainda por cima se for por "obrigação"' (Post-CQ L12: Q6).

(11b) '[...] Só gostaria que não fosse [o curso] tão intensivo para eu poder corresponder e empenhar-me mais, principalmente em relação aos trabalhos de casa' (Post-CQ L15: Q7).

Chapter 8

Pages 223-224

(1a) 'Por vezes até acho que são mais fáceis. Para mim o conteúdo é mais fácil, são mais simples. [...] Umm... Acho que às vezes os portugueses complicam muito os textos... estou a falar de textos científicos, complicam mais e... empregam palavras, assim... muito mais difíceis que também temos que ir ver ao dicionário, não é? E acho que os ingleses são mais fáceis de ler... de compreender... são mais simples, acho que são mais simples' (Int. S1: Q32.4 – my emphasis).

(1b) São, são aí acho que sim. Acho que são, lá está pela própria forma, de ele... da escrita [...] acho que são diferentes. [...] acho que os ingleses são *um pouco mais práticos dizem logo aquilo que é e acho que nós não. Acho que nós andamos ali um bocadinho a rodear as coisas antes de chegar mesmo à, àquilo* *que nós queremos dizer* mas acho que também tem um pouco a ver com a maneira de escrever dos portugueses, se calhar, um pouco isso e acho que... é relativa... os *inglese é um bocadinho diferente acho que a entrada da, dos assuntos* e de tudo o resto acho que é um bocadinho diferente da nossa' (Int. S17: Q2.4 – my emphasis).

(1c) '[...] quanto aos académicos acho que às vezes *os ingleses são mais fáceis* porque... [...] E também são um bocadinho... *mais directos... quando querem dizer uma coisa dizem-na enquanto se for em português ou, às vezes, mesmo em espanhol andam ali tipo a dar umas voltinhas para dizer uma coisa e aquilo também cansa um bocado.* Geralmente quando se tem que estudar e... não cativa tanto... para uma pessoa ler aquilo tudo' (Int. S5: Q2.4 – my emphasis).

Page 225
'É o facto de não dominar a língua, portanto, não dominado a língua aah... perco muito mais tempo a ler textos em inglês e... e... [...] Talvez o vocabulário, é o não conhecer muito vocabulário e... pronto, e como não estou à vontade na construção gramatical o ser aah... *unless* [in English in the original] ou outra palavra parecida, às vezes, confunde porque quer dizer precisamente o contrário' (Int. L4 Q3.1).

Pages 225-226
(2a) 'A construção das frases [em inglês] sim, que é ao contrário, mas... dos textos em si acho que não é assim muito diferente' (Int. L10: Q3.4).

(2b) '[...] e depois como a língua inglesa não tem nada ver c'a nossa porque nós é uma língua latina e eles não, não é. E a maneira da conjugação das frases e dos verbos e tudo é completamente diferente do nosso [...]' (Int. S17: Q2.2).

(2c) 'Aah... Por vezes sim... [a estrutura frásica é um problema] por vezes ainda sim. Aah... por vezes, sim porque pronto... lendo a língua inglesa aah... tenho... às vezes pronto... troca assim um bocado... os... *a informação parece que vem depois... que vem primeiro o verbo depois acho que vem o adjectivo*, não sei agora também se 'tou bem a dizer uma coisa que não 'tá correcta... mas... por vezes, sim' (Int. S18: Q3.4 – my emphasis).

(2d) 'Há [uma estruturação específica do inglês] a *nível da construção frásica* aí obviamente que sim [há diferenças] [...]' (Int. L5: Q3.4 – my emphasis).

Page 226
(3a) '[...] talvez um inglês técnico muito cerrado às vezes apareça em que terei mais dificuldade [...]' (Int. L6: Q2.2).

(3b) 'Se... se... essencialmente se não for *demasiado técnico... que faz com que tenha de estar constantemente a procurar e a parar e a tentar perceber o sentido das frases e do texto* aah... faço-o com gosto e, não... não... sem grandes dificuldades' (Int. S4: Q2.2 – my emphasis).

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T [Q2.4] E consideras que os textos escritos em inglês são muito diferentes dos textos escritos em português?

L15 Aah... Diferentes como?

T Não sei, se notas, pronto se tens de ler um texto em português ou um texto sobre o mesmo tema em inglês, se a maneira como está escrito ou organizado... se notas alguma diferença ou diferenças...

L15 Claro. Depende, uma das coisas que sinto diferença, mesmo nos próprios textos em inglês, se são textos feitos por pessoas que a língua nativa é inglês são sempre diferentes de textos em que a língua nativa não é o
→ inglês. E esses são mais difíceis de ler.

T E quais são essas diferenças concretas que encontras? Se é que me podes dar um exemplo...

L15 → Sim... É uma leitura mais difícil... são frases mais longas é mais baralhado, é mais complicado de ler.

T Os nativos?

L15 Não, os não nativos.

T Os não nativos.

L15 Se calhar, por uma tentativa de tradução... torna-se mais complicado do
→ que os ingleses que é sua língua... nativa e têm muito maior fluência a escrever do que as outras pessoas, é normal também. Mas tenho alguma dificuldade em ler... artigos principalmente os artigos de... sítios ou de pessoas que não inglesas ou americanas... aah... nos canadianos não tenho grandes dificuldades é mais nos outros países.

T = teacher-interviewer (Int. L15: Q2.4)

Page 229

'Não, quer dizer, não, não pensei nisso e portanto não... ((Silêncio)) Enfim digamos que *o interesse do entrevistador e do entrevistado não são os mesmos*, não é? De maneira que... pronto não... não pensei no assunto e assim à partida não tenho nada, nada a acrescentar... Pronto a *linguística não é comigo*, não é? ((Riso))' (Int. L6: Q3.5 – my emphasis).

Pages 229-230

(4a) 'Aah... Não. Acho que não. Também nunca tinha pensado bem nisso [se a organização de textos académicos é um problema]. Mas... mas não nunca liguei a isso, leio assim...' (Int. S1: Q3.4).

(4b) 'Como é que aprendo [palavras novas em inglês]? ((Silêncio)) Nunca tinha pensado nisso. ((Riso))' (Int. S18: Q2.7).

(4c) 'Embora nunca tenha, digamos assim, nunca me tenha preocupado, ou digamos assim, nunca me tenha debruçado muito sobre a comparação desse tipo de coisas mas não, não tenho noção que haja, digamos assim, uma estruturação específica no inglês em termos de texto global' (Int. L5: Q3.4).

(4d) On the structure of academic genres:

'Sim [beneficiaria da aprender mais sobre este tópico] *porque nunca me tinha apercebido das coisa numa perspectiva de estudo*' (1FBQ S15: Q5 – my emphasis).

(4e) '[O que achei mais útil no curso foi...] a sistematização de conceitos *que se sabem de um modo um pouco empírico*. Após o curso analisa-se melhor o texto na sua estrutura e também se *conseguem identificar melhor certas "nuances"* [in French in the original] *das quais não tínhamos uma percepção tão segura*' (Post-CQ L9: Q5 – my emphasis).

Pages 230-231

(5b) On metatext:

'Aprendi que escrevemos de forma diferente da dos autores ingleses e percebi melhor a forma como os temas vão apresentados e como podem ser lidos em Inglês' (2FBQ L8: Q6).

(5c) On noun chains:

'Aprendi que a formação das frases em inglês pode ser totalmente diferente do português. E também o significado de frases resumidas em apenas algumas palavras' (5FBQ S10: Q6).

(5d) On nominal style:

'Entender a forma de escrever em inglês o que facilitará no futuro (talvez) traduzir mais rapida/ (compreender melhor o que o autor quer dizer) (Por vezes a tradução para português é complicada, sobretudo o sentido que a frase pretende transmitir)' (6FBQ L8: Q6).

(5e) On hedging:

'[Aprendi] as diferenças culturais entre o escrever em inglês e português [...]' (7FBQ S3: Q6).

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(6a) 'A melhor compreensão da estrutura do texto que permitirá certamente um melhor entendimento do mesmo dada a diferença estrutural e conceptual entre a escrita em língua inglesa por ingleses e a escrita em português' (Post-CQ L3: Q5).

(6b) 'O que achei mais útil no curso foi o facto de tomar conhecimento do tipo de linguagem científica, bem como da forma de escrever, de outra língua diferente do português' (Post-CQ S14: Q5).

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'Diferenças entre artigos científicos e outros, livros de vários tipos e *para diferentes destinatários*' (1FBQ L12: Q6 – my emphasis).

Page 235

'Pronto, acho que isso é do... *é da responsabilidade do autor, o autor... enfim giza o artigo com a estrutura que ele quiser, com a organização que ele quiser e... eu penso que é o leitor que tem que se adaptar ao... digamos, à orgânica, à estruturação do texto, não é?* Portanto, essa questão da estrutura não me preocupa muito. É claro que... se for um texto inteiro que do princípio ao fim não tem nenhuma divisão... a coisa é um bocadinho mais complicada. Agora se for um texto que esteja, de facto, divido em secções com introdução, material e métodos aah... resultados, conclusões... aí... enfim... digamos que tenho a tarefa facilitada uma vez que aí já me será mais fácil, se não quiser ler todo, seleccionar as partes que mais interessa, não é? Portanto, numa primeira análise a estrutura não me interessa, *acho que o autor que é livre e que optará por a organização do texto que mais lhe convier e deverá ser o leitor a adaptar-se, não é?*' (Int. L6: Q3.4 – my emphasis).

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(7b) On metatext:

'Ter em atenção os "alertas" dados como as chamadas de atenção, as acções que o autor vai fazer, de forma a compreender melhor o texto em estudo' (2FBQ S17: Q6).

(7c) On metatext:

'[Vou usar o conteúdo desta sessão para ler] em todos os textos que leia em inglês, pois se os ingleses escrevem assim, há que aproveitar!' (2FBQ L10: Q4).

(7d) On connectors:

'[Vou usar o conteúdo desta sessão para ler] [n]outras línguas quando o utilizarem e para eu simplificar a leitura dos textos que escrevo' (2FBQ L14: Q4).

(7e) On discourse structuring words:

'Poderá ajudar a perceber (rapidamente) a intenção do autor' (4FBQ S18 Q6).

(7f) On reporting verbs:

'Aprendi a "reparar" na existência dos verbos (e na forma como são conjugados), na tentativa do autor os usar para ajudar o leitor a fazer relações com outras "coisas" que já foram ditas acerca desse assunto' (8FBQ L11: Q6).

(7g) [O que achei mais útil no curso foi...] ... aprender certas formas de escrita académica, e utilizá-las como uma espécie de guia [...]' (Post-CQ S5: Q5).

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(8a) '[...] há artigos ou textos que eu consigo tirar logo o sentido' (Int. S1: Q3.3).

(8b) '[...] se eu pretender saber, *aceder aquele tipo de informação*, [a língua inglesa] não irá interferir só se for um texto com vocabulário difícil' (Int. S18: Q2.2 – my emphasis).

(8c) 'Porque lê textos em inglês?'
'Aah... a *informação que procuro* e... a *informação que procuro...*' (Int. S18: Q2.3 – my emphasis).

(8d) '[...] das formas de obtenção de informação que eu mais utilizo é a leitura' (Int. L5: Q1.1).

(8e) 'Outros textos que não literários e que não científicos [...] acho que tenho alguma facilidade em, em extrair a informação' (Int. L5: Q1.7).

(8f) '[...] se é um texto mesmo para espremer para retirar a informação que ele contém [...]' (Int. L6: Q3.2).

Pages 242-243

(9a) On metatext:

'Aprendi a "situar-me" no texto, i.e. a perceber o que se vai "fazer", o que "se fez", e o que o autor "está a fazer"' (2FBQ L11: Q6).

(9b) On connectors:

'[Aprendi] [q]ue estas palavras salientam uma ideia e são guias para uma melhor leitura' (3FBQ S1: Q6).

(9e) On noun chains:

'Não me tinha apercebido da complexidade das *noun chains* [in English in the original] e julgo serem muito importantes para se perceber os textos' (5FBQ S17: Q4).

(9f) On hedging:

'[Aprendi a] categorizar por níveis de "commitment" [in English in the original] as opiniões expressas no texto' (7FBQ L2: Q6).

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S8?		<During this time> *também... pode ser?*
T		No no.
S8?		*Não?*
T	→	No because this is this is making a reference when you are doing something. *É durante este tempo. Portanto isto não tem referência-*
S8?	→	*Mas como foi referido o tempo atrás-*
S8?		*Mas não é o resumo de qualquer coisa não nos dá a ideia de qualquer coisa.*
S8?		Mmm...
T		*Têm que ser sempre palavras que de alguma forma resumem ou põem de uma forma muito concisa.*
S8?		((unint))
T		*Qualquer coisa qualquer coisa que vai ser referida ou para a frente ou p'ra- ou que já foi referida p'ra trás.*
S8		*Ou que já foi.*

(4Transc. SS1)

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L9	Assumed? Assumed?
T	Let me see.
L4	*Não isto é o princípio da frase.*

L9 *É assim.*
L9/L4 *É assim.*
L9 *É assim é assim* <although previous research assumed that sheeps... digested concentrates better than cattle...>
L9/L4 → <our results demonstrate that maize gluten feed is better digested.>
T Yes very good... very nice ((low voice))
Just another 's'.
L Aah!
T Yes it's good!
L9 → *Agora... agora suave.* ((T laughs))
L3 → *Pois agora... podíamos era fazer já esta ao contrário.*
L7 → *Agora aqui... pomos* suggest.
The results suggest *e aqui tamém e 'tá feito.* ((L3, L7 and T laugh))
T Yes you see ((T laughs)) you can say the same thing ((T and LL laugh)) ((unint)) just changing one or two words you can change completely-
L8 *Eu empresto-te uma caneta vermelha para pôr aí muito bom.* ((T and LL laugh))
L3 ((unint)) *Pois quero.*
(7Trans. LL1)

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T Or even if you want you may say the results may suggest or seem to suggest.
L3 *Pois... exacto.*
T Or apparently suggest.
L3 Apparently... the results may suggest.
L7 → *Então é é...* this is too much hedging ((LL and T laugh))
T It depends for whom you're writing how much hedging you need.
(7Transc. LL1)

Page 251
L14 *As pessoas aquelas pessoas que são... como é que é...*
L15 *Disléxicas?*
L14 *Não... aah... inseguras são bons nesta em fazer esta-*
LL ((LL laugh))
L12 Are not usually compatible is okay?
T Are not usually compatible yes I tell you what the writers the writers had <might not seem compatible> you see?
LL Yes ((LL laugh)) / yes.
T <Might not seem compatible> this is also something cultural this has to be with the way people speak the way people are... is not

something that is forced this has to do with the Anglo-Saxon culture okay?
LL ((unint))
T It has to do with politeness... in general
L14 Unbelievable! ((L14 laughs))
(7Transc. LL2)

Page 252

(12a) 'A disponibilidade de água *parece* favorecer a ingestão. Contudo a manifestação do seu efeito *pode* ainda aparecer limitada pelo facto de haver um bebedouro alternativo no parque' (1Pre-T L14: Q6 – my emphasis).

(12b) 'Comedouro individual húmido, mas *sugerem* a necessidade de melhor clarificar o assunto' (1Pre-T L14: Q8 – my emphasis).

(12c) 'Não, só um pequeno aumento no tamanho do grupo *poderia ser* possível' (2Pre-T L14: Q6 – my emphasis).

(12d) 'A menor idade de primeira gestação *parece ser* mais hereditária do que referido em estudos anteriores' (2Post-T L14: Q5 – my emphasis).

(12e) 'Ambas as estirpes são, *de forma aproximada*, mais ou menos resistentes aos diferentes fungicidas' (3Pre-T L14 – my emphasis).

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'[...] abordarem assuntos que, por alguma razão, não são integrados no curriculum normal da disciplina de inglês' (Post-CQ S2: Q5).

Pages 253-254

(13a) '[O curso] tirou-me muitas dúvidas em relação a algumas questões em textos' (Post-CQ S21: Q5).

(13b) 'Tudo. Gostei imenso da forma como estava organizado, principalmente por ir de encontro a necessidade diárias que nunca nos tínhamos apercebido que tínhamos' (Post-CQ L15: Q5).

(13c) 'Neste momento perante um texto em inglês tenho maior facilidade em interpretar e compreender a ideia que o autor nos quer transmitir' (Post-CQ S20: Q5).

Chapter 9

Page 258

'E agora quando comecei com o curso, não é? 'Tou a sentir que afinal não sou tão boa como eu pensava. (Riso) Tenho... Acho... 'Tou a ter mais dificuldade agora do que eu tinha. [...] Mas pensava que era melhor. ((Riso))' (Int. S9: Q2.5).

Pages 259-260

L15 *Apesar de eu concordar perfeitamente as razões que eles usam estas... os* hedging *eu penso que em certas... situações ou também depende do tipo de metodologias que nós estamos a utilizar nós temos de ser directos e quanto mais directos melhor e nem por isso estamos a ser indelicados com as pessoas temos de ser... aah... directos e... mais concisos não haver tantas incertezas porque se... há tantas incertezas... não se sabe nada.*

(7Transc. LL2).

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T But not all texts not all topics you read use a lot of hedging.

L15 *Pois... É por isso que eu sou tão pragmática porque a minha área é assim* ((L15 laughs)).

(7Transc. LL2)

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(1a) 'Aprendi a reparar em cadeias de palavras, que significam algo diferente, do que é traduzível em Português' (5FBQ L11: Q6).

(1b) 'Facilidade em traduzir alguns textos com trocadilhos que às vezes não fazem sentido' (5FBQ L8: Q6).

(1c) '[Gostaria de aprender mais] porque assim quando estou a fazer traduções já possivelmente não irei ficar tão 'atrapalhada' quando vir muitos substantivos' (5FBQ S15: Q4).

(1d) 'Que as palavras não significam aquilo que possamos pensar à primeira vista, e que existe diferença de português para inglês' (5FBQ S21: Q6).

(1e) 'Com traduzir e/ou entender correctamente expressões que aparecem frequentemente em textos e que até aqui têm sido mal interpretados' (5FBQ S3: Q6).

(1f) 'Ajuda a interpretar certas frases e palavras com uma estrutura diferente da usada em português' (5FBQ S8: Q6).

Pages 261-262

(2a) 'No caso dos textos mais técnicos, ou mais objectivos mesmo que não sejam propriamente científicos mas que são mais objectivos aah... [...]' (Int. L5: Q3.1).

(2b) '[ler textos académicos com o objectivo de] extracção de informação do texto e não tanto na, na compreensão específica do texto na, na sua compreensão, digamos assim, mais... mais precisa, não é?' (Int. L5: Q3.1).

(2c) 'E há outros [textos académicos] que... é mesmo sobre aquele tema e então tenho que ler de uma ponta a outra porque preciso de saber mesmo aquilo tudo' (Int. S5: Q2.13).

(2d) '[...] se é uma coisa a nível académica ou uma coisa que eu tenho que ler aah... [...] porque tenho me'mo que saber o que lá 'tá' (Int. L10: Q2.13).

(2e) 'Aah... [leio] os capítulos que, que têm... mais necessidade de... perceber ou de aprender [...] (Int. L15: Q2.11).

(2f) 'eu uso os livros mais aah... como consulta' (Int. L10: Q2.10).

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'Quer dizer porque à partida também não vejo que haja uma estrutura, uma organização específica, digamos assim, dos textos em inglês embora, embora a gente tenha abordado isso neste curso e tenhas alertado para esses aspectos, digamos assim, e de algumas, de algumas aah... particularidades que os autores ingleses ou de língua nativa inglesa têm na sua... na elaboração dos textos [...].' (Int. L5: Q3.4).

Appendix 2
Catalogue of data

Table 1: Pre-tests and Post-tests

	Cloze test	Pre-test 1	Pre-test 2	Pre-test 3	Pre-test 4	Post-test 1	Post-test 2	Post-test 3	Post-test 4
L1	X	X	X	X	X	X	X	X	X
L2	X	X	X	X	X	X	X	X	X
L3	X	X	X	X	X	X	X	X	X
L4	X	X	X	X	X	X	X	X	X
L5	X	X	X	X	X	X	X	X	X
L6	X	X	X	X	X	X	X	X	X
L7	X	X	X	X	X	X	X	X	X
L8	X	X	X	X	X	X	X	X	X
L9	X	X	X	X	X	X	X	X	X
L10	X	X	X	X	X	X	X	X	X
L11	X	X	X	X	X	X	X	X	X
L12	X	X	X	X	X	X	X	X	X
L13	X	X	X	X	X	X	X	X	X
L14	X	X	X	X	X	X	X	X	X
L15	X	X	X	X	X	X	X	X	X
S1	X	X	X	X	X	X	X	X	X
S2	X	X	X	X	X	X	X	X	X
S3	X	X	X	X	X	X	X	X	X
S4	X	X	X	X	X	X	X	X	X
S5	X	X	X	X	X	X	X	X	X
S6	X	X	X	X	X	X	X	X	X
S7	X	X	X	X	X	X	X	X	X
S8	X	X	X	X	X	X	X	X	X
S9	X	X	X	X	X	X	X	X	X
S10	X	X	X	X	X	X	X	X	X
S11	X	X	X	X	X	X	X	X	X
S13	X	X	X	X	X	X	X	X	X
S14	X	X	X	X	X	X	X	X	X
S15	X	X	X	X	X	X	X	X	X
S16	X	X	X	X	X	X	X	X	X
S17	X	X	X	X	X	X	X	X	X
S18	X	X	X	X	X	X	X	X	X
S19	X	X	X	X	X	X	X	X	X
S20	X	X	X	X	X	X	X	X	X
S21	X	X	X	X	X	X	X	X	X
Total	**35**	**35**	**35**	**35**	**35**	**35**	**35**	**35**	**35**

L1 = Lecturer 1, etc.; S1 = Student 1, etc.

Table 2: Unit tasks: Activities A, Activities C and Feedback questionnaire

	UNIT 1			UNIT 2			UNIT 3			UNIT 4			UNIT 5			UNIT 6			UNIT 7			UNIT 8			UNIT 9		
	A	C	FBQ	A	C	FBQ	A	C	FBQ	A	C	FBQ	A	C	FBQ	A	C	FBQ	A	C	FBQ	A	C	FBQ	A	C	FBQ
L1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
L2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
L3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
L4	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
L5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
L6	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
L7	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
L8	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
L9	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
L10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
L11	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
L12	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
L13	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
L14	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
L15	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
S1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
S2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
S3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
S4	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
S5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
S6	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
S7	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
S8	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
S9	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
S10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
S11	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
S13	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
S14	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
S15	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
S16	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
S17	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
S18	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
S19	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
S20	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
S21	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Total	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35

L1 = Lecturer 1, etc.; S1 = Student 1, etc.
A = Activities A; C = Activities C; FBQ = Feedback questionnaire.

Table 3: Interview, Pre-course and Post-course questionnaires

	Interview	Pre-course Questionnaire	Post-course Questionnaire
L1		X	X
L2		X	X
L3		X	X
L4	X	X	X
L5	X	X	X
L6	X	X	X
L7		X	X
L8		X	X
L9		X	X
L10	X	X	X
L11		X	X
L12		X	X
L13		X	X
L14		X	X
L15	X	X	X
S1	X	X	X
S2		X	X
S3		X	X
S4	X	X	X
S5	X	X	X
S6		X	X
S7		X	X
S8		X	X
S9	X	X	X
S10		X	X
S11		X	X
S13		X	X
S14		X	X
S15		X	X
S16		X	X
S17	X	X	X
S18	X	X	X
S19		X	X
S20		X	X
S21		X	X
Total	**11**	**35**	**35**

L1 = Lecturer 1, etc.; S1 = Student 1, etc.

Table 4: Unit Homework and While-reading questionnaire

	UNIT 1		UNIT 2		UNIT 3		UNIT 4		UNIT 5		UNIT 6		UNIT 7		UNIT 8		UNIT 9	
	HW	WRQ	HW	WRQ	HW	WRQ	HW	WRQ	HW	WRQ	HW	WRQ	HW	WRQ	HW	WRQ	HW	WRQ
L1																		
L2			X	X	X	X	X	X	X	X	X	X						
L3	X	X																
L4	X	X	X	X	X													
L5	X	X	X	X	X	X	X	X										
L6	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
L7	X	X																
L8	X	X																
L9																		
L10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	
L11	X	X	X	X	X	X	X	X										
L12																		
L13	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
L14	X	X	X	X	X	X												
L15																		
S1	X	X																
S2	X	X	X	X	X	X	X	X										
S3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
S4																		
S5	X		X		X	X	X	X										
S6	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
S7	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
S8	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
S9	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
S10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
S11	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
S13	X	X	X	X	X	X	X	X	X	X								
S14	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
S15	X	X	X	X														
S16	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
S17																		
S18																		
S19	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
S20																		
S21	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Total	**26**	**24**	**23**	**22**	**22**	**21**	**20**	**20**	**16**	**16**	**15**	**15**	**14**	**14**	**14**	**13**	**14**	**13**

L1 = Lecturer 1, etc.; S1 = Student 1, etc.
HW = Homework; WRQ = While-reading questionnaire

Table 5: Observations and Transcriptions

	Teacher-observer		Teacher-participant-researcher	
	Observation notes	**General observation notes**	**Transcriptions**	**Course notes**
LL1	Unit 4 Unit 7		Unit 4 Unit 7	All units
LL2[1]	Unit 4		Unit 4 Unit 7	All units
SS1[2]	Unit 4 Unit 7		Unit 4	All units
SS2	Unit 4 Unit 7		Unit 4 Unit 7	All units
All groups		Course in general		Course in general

LL1 = group of lecturers number 1; LL2 = group of lecturers number 2; SS1 = group of students number 1; SS2 = group of students number 2.

[1] Unit 7 could not be observed because the participants changed the schedule and the teacher-observer had a class at that time.

[2] Unit 7 could not be recorded as the microphone developed a fault at the very beginning of the lesson. I then tried to record the lesson on microcassette by holding the tape recorder in my hand. However, when I attempted to transcribe it immediately after the lesson, it proved impossible as the sound quality was very poor.

Coding used to reference the data. Some examples:

Reference to:	Examples:
Observation notes (by teacher-observer) (= **Obs.N.**) Unit 4 (= **4**) Group of students number 1 (= **SS1**)	'All are very concentrated, asking frequently (at least 8 times) the meaning of words in the text 4A-1. […] They always show interest and discuss things among themselves in order to complete tasks' (4Obs.N. SS1 – my translation).
Observation notes (by teacher-observer) (= **Obs.N.**) General course comments (= **GC**)	'Participants' motivation is certainly high otherwise it would be impossible to maintain the proposed working rhythm (Obs.N. GC – my translation).
Course notes (by teacher-participant-researcher) (= **CN**) Unit 6 (= **6**) Group of students number 2 (= **SS2**)	'Their [SS2 group] lesson was late – 5.30pm-7.30pm (this may account for students' tiredness). This group appeared to have some difficulty in following the lesson (could be seen in their faces and silence). However, they understood the difference between the examples (nominal and verbal style) given in the handout' (6CN SS2).
Course notes (by teacher-participant-researcher) (= **CN**) Unit 6 (= **6**) General comments to the 4 groups (= **GC**)	'Some participants found it difficult to make a distinction between style and content of academic texts' (6CN GC).
Interview (= **Int.**) Student 18 (= **S18**) Question 1.4 (= **Q1.4**)	'The *Internet* [in English in the original] also, nowadays we can surf the *Internet*' (Int. S18: Q1.4 – my translation and emphasis).
Feedback questionnaire (= **FBQ**) Unit 2 (= **2**) Lecturer 11 (= **L11**) Question 6 (= **Q6**)	'I learnt to "situate" myself in the text, i.e. to understand what is going to be "done", what "has already been done" and what the author "is doing" at that moment in the text' (2FBQ L11: Q6 – my translation).
Homework (= **HW**) Unit 5 (= **5**) Lecturer 13 (= **L13**)	'As there is no acceptable translation in Portuguese the original term was kept' (5HW L13 – my translation).

Reference to:	**Examples:**
Pre-course questionnaire (= **Pre-CQ**) Lecturer 5 (= **L5**) Question 26 (= **Q26**)	'As far as question 10 is concerned [i.e. 'In which languages are the references on your reading lists?'] at present I recommend few books in English due to the fact that students show both difficulty and no interest in such books. It should be noted that this happens despite the fact that in the ESACB [i.e. college] library there are publications of great interest for the courses taught' (Pre-CQ L5: Q26).
Post-course questionnaire (= **Post-CQ**) Student 2 (= **S2**) Question 7 (= **Q7**)	'Thank you for everything you taught us! Congratulations and good luck for the future…' (Post-CQ S2: Q7).
Unit 9 (= **9**) Handout (= **H**) Page 1 (= **1**)	'the sentence(s) that tell the reader what the main claim (= what the writer wants the readers to believe) or main point of a journal article is' (9H: 1)
Unit 2 (= **2**) Activities A (= **A**) Lecturer 3 (= **L3**) etc. Student 6 (= **S6**) etc.	'*Recall that at sea level*, a column of air weighs slightly more than 1 kilogram per square centimeter and therefore exerts that amount of pressure' (2A: L3, L4, L8, L10, L13, L15, S6, S7, S11, S13, S15 – my emphasis).
Unit 1 (= **1**) Activities A (= **A**) Task 1.2 (= **1.2**) Student 16 (= **S16**)	'Specific text about agriculture' (1A-1.2: S16 – my translation).
2 Pre-test (= **1Pre-T**) Lecturer 14 (= **L14**) Question 6 (= **Q6**)	'No, only a small increase in group size *would be* possible' (2Pre-T L14: Q6 – my translation and emphasis).
2 Post-test (= **2Post-T**) Lecturer 14 (= **L14**) Question 5 (= **Q5**)	'[Heifer] first pregnancy at an early age *seems* more hereditary than previously reported' (2Post-T L14: Q5 – my emphasis).

Transcription (= **Transc.**) Unit 4 (= **4**) Group of students number 2 (= **SS2**)	S1?	→	565	*Teacher what does <features> mean?*
	T			<Features>? It's in a way characteristics ((SS laugh)) things that belong to something.
	S4?	→		Teacher? ((unint)) <features>
	(4Transc. SS2)			

APPENDIX 3

Questionnaire (December 1999)

Lecturers' Questionnaire - Part 1 (December 1999)

Dear Colleague,

As you probably know I am in Edinburgh beginning a PhD in Applied Linguistics. My topic is developing reading skills in English as a foreign language. I am particularly interested in improving academic reading in the College of Agriculture of the Polytechnic Institute of Castelo Branco, since this appears to be a common need of both lecturers and students. In order to achieve this I will look at using writing skills as well (in Portuguese and /or English) as a tool to improve reading.

Firstly, I thought of working only with students. However, there are also other possibilities: working with students and colleagues (in separate groups) or working only with colleagues, depending on the good will of both groups. I would then need your cooperation in the form of attending an English course next academic year (2000/01) and permission to use your written material produced on the course and/or given together with **Part 2**. In the past some of you have already asked for an English course for teachers. Maybe the opportunity to do it has arrived! I would probably need a volunteer group of about 10 teachers to run this course.

I would be very grateful if irrespective of your availability to attend the course, you would complete **Part 1** of the questionnaire, so that I could have a general idea of how English is used in reading and in academic writing by the staff of the College of Agriculture of the Polytechnic Institute of Castelo Branco. **Part 2** is a shorter non-anonymous questionnaire for those of you who would like to collaborate and attend the course on reading which I will run in the next academic year (2000/01). The answers to **Part 2** will allow me to know whether I have a volunteer group for the course. This will help me to write up my research proposal.

Thank you!

Isabel Figueiredo Silva

1. For how many years did you study English in secondary education? Please tick (✓) one box.

1	☐	5	☐
2	☐	6	☐
3	☐	7	☐
4	☐	8	☐

2. Did you attend any language institute to learn English? Please tick (✓) one box.

YES ☐ NO ☐

If you answered **yes** to the previous question, please answer question **3**.

3. For how many years did you study English in the language institute? Please tick (✓) one box.

1	☐	3	☐
2	☐	4	☐

Other ______________________________

4. Did you live in an English speaking country? Please tick (✓) one box.

YES ☐ NO ☐

Which? ______________________________

If you answered **yes** to the previous question, please answer question **5**.

5. For how many years did you live in an English-speaking country? Please tick (✓) one box.

1	☐	3	☐
2	☐	4	☐

Other ______________________________

6. Did you study in an English speaking country? Please tick (✓) one box.

YES ☐ NO ☐

Which? ____

If you answered **yes** to the previous question, please answer question 7.
7. For how many years did you study in an English-speaking country? Please tick (✓) one box.

1 ☐ 3 ☐

2 ☐ 4 ☐

Other ____

8. Do you read in English?

YES ☐ NO ☐

If you answered **yes** to the previous question, please answer questions **9, 10, 11, 12, 13** and **14.**
If you answered **no** to the previous question, please go directly to question **15.**

9. How do you rate your academic reading in English? Please tick (✓) one box.

	easily	with some difficulty	with great difficulty
9.1 I only read simple everyday texts.	☐	☐	☐
9.2 I read advanced textbooks.	☐	☐	☐
9.3 I read technical and scientific texts.	☐	☐	☐
9.4 I read novels.	☐	☐	☐
9.5 I read non-fiction texts (e.g. essays).	☐	☐	☐
9.6 I read newspapers.	☐	☐	☐
9.7 I read magazines.	☐	☐	☐
9.8. I read texts in the internet.	☐	☐	☐
9.9 I read poetry.	☐	☐	☐

10. Can you name the three last texts in English you read?

11. What sort of texts do you read in English for your teaching and academic work and how often?

	a lot	a few	very occasionally
11.1 Textbooks you recommend to your students	☐	☐	☐
11.2 Research articles	☐	☐	☐
11.3 Technical books	☐	☐	☐
11.4 Scientific books	☐	☐	☐
11.5 Conference proceedings	☐	☐	☐
11.6 Theses and dissertations	☐	☐	☐
11.7 Formal letters	☐	☐	☐
11.8 Project proposals	☐	☐	☐

11.9 Other (please specify) ______________________________

12. What sort of texts in English do you recommend to your students?

	a lot	**a few**	**very occasionally**
12.1 Textbooks	☐	☐	☐
12.2 Research articles	☐	☐	☐
12.3 Technical books	☐	☐	☐
12.4 Scientific books	☐	☐	☐
12.5 Conference proceedings	☐	☐	☐
12.6 Theses and dissertations	☐	☐	☐

12.7 Other (please specify) ____

If you ticked **12.1** could you please give examples of the textbooks you consider relevant for the course(s) you teach.

If you ticked **12.2** could you please give examples of the journals you consider relevant for the course(s) you teach.

13. Is there a difference between recommended reading for taught courses and for students carrying out their final research project?

YES ☐ NO ☐

If you answered **yes** to the previous question, please answer question **14**.

14. Please specify the differences in the recommended reading for taught courses and for students carrying out final research projects.

15. Do you write texts in English? Please tick (✓) one box.

YES ☐ NO ☐

If you answered **yes** to the previous question, please answer question **16.**
If you answered **no** to the previous question, please go directly to question **19.**

16. How do you rate your written English language competence? Please tick (✓) one box.

	easily	**with some difficulty**	**with great difficulty**
16.1 I write simple everyday texts	☐	☐	☐
16.2 I write technical and scientific texts	☐	☐	☐
16.3 I write formal letters	☐	☐	☐
16.4 I write project proposals	☐	☐	☐

16.5 Other (please specify) ____________________

17. Do you write in English for your academic career? Please tick (✓) one box.

YES ☐ NO ☐

If you answered **yes** to the previous question, please answer question **18.**

18. What have you written in English for your academic career? Please tick (✓) one or more boxes.

18.1 Abstracts of research articles ☐

18.2 Abstracts of conference papers ☐

18.3 Research articles ☐

18.4 Conference papers ☐

18.5 An abstract of an MSc dissertation ☐

18.6 An MSc dissertation ☐

18.7 An abstract for a PhD ☐

18.8 A PhD thesis ☐

18.9 Project proposals ☐

18.10 Formal letters ☐

18.11 Other (please specify) ___________________________________

19. Is there anything else of relevance you would like to add?

Please hand in the questionnaire to **Isabel Oliveira**, **Paulo Gomes**, **Eduarda Rodrigues** or **Isabel Rodrigues** or leave it in their pigeonholes **by the 27th of December**. Thank you for your help!

Students' Questionnaire - Part 1 (December 1999)

Dear Student,

I am one of the English teachers of the College of Agriculture of the Polytechnic Institute of Castelo Branco and I was probably your English teacher some years ago. At present I am in Edinburgh beginning a PhD in Applied Linguistics. My topic is developing reading skills in English as a foreign language. I am particularly interested in improving academic reading, since this appears to be a common need of both lecturers and students. In order to achieve this I will also look at using writing skills (in Portuguese and /or English) as a tool to help students read better.

I would then need your cooperation in the form of attending an English course next academic year (2000/01) and permission to use your written material produced on the course and/or given with **Part 2**. In the past some of you asked me to proofread the abstract of your final research project (3rd year), since you had some difficulty in writing it in English. Soon you will have to write another one (5th year) and I know this may be difficult for some of you. This will possibly be one of the topics covered in the course I will offer in the next academic year on developing reading skills in English. I would like to recruit a volunteer group of students in order to implement this course. Would you be interested in taking part?

I would be very grateful if irrespective of your availability to attend the course, you would complete **Part 1** of the questionnaire so that I could have a general idea of how English is used (or not used) in reading and in academic writing by the students of the College of Agriculture of the Polytechnic Institute of Castelo Branco. **Part 2** is a shorter non-anonymous questionnaire for those of you who would like to collaborate and attend the course on reading which I will run next academic year (2000/01). The answers to **Part 2** will allow me to know whether I have a group of volunteers for the course.

Thank you!

Isabel Figueiredo Silva

COURSE ____

Year of the course you are attending this academic year. Please tick (✓) one box.

3rd year ☐ 4th year ☐ 5th year ☐

1. For how many years did you study English in secondary education? Please tick (✓) one box.

1	☐	5	☐
2	☐	6	☐
3	☐	7	☐
4	☐	8	☐

2. Did you attend any language institute to learn English? Please tick (✓) one box.

YES ☐ NO ☐

If you answered **<u>yes</u>** to the previous question, please answer question **3**.

3. For how many years did you study English in the language institute? Please tick (✓) one box.

1	☐	3	☐
2	☐	4	☐

Other ____

4. Did you live in an English speaking country? Please tick (✓) one box.

YES ☐ NO ☐

Which? ____

If you answered **<u>yes</u>** to the previous question, please answer question **5**.

5. For how many years did you live in an English-speaking country? Please tick (✓) one box.

1	☐	3	☐
2	☐	4	☐

Other ____

6. Did you study in an English speaking country? Please tick (✓) one box.

YES ☐ NO ☐

If you answered **yes** to the previous question, please answer question **7**.

7. For how many years did you study in an English-speaking country? Please tick (✓) one box.

1 ☐ 3 ☐

2 ☐ 4 ☐

Other ____________________________

8. Which English course did you attend at the College of Agriculture? Please tick (✓) one box.

8.1 Beginners ☐

8.2 Intermediate ☐

8.3 Post-Intermediate ☐

9.1 Can you read in English? Please tick (✓) one box.

YES ☐ NO ☐

If you answered **no** to the previous question, please go directly to question **14**.

9.2 How often do you read texts in English? Please tick (✓) one box.

Never ☐

Seldom ☐

Sometimes ☐

Often ☐

Constantly ☐

10. How do you rate your reading in English? Please tick (✓) one box.

	easily	with some difficulty	with great difficulty
10.1 I only read simple everyday texts.	☐	☐	☐
10.2 I read advanced textbooks.	☐	☐	☐
10.3 I read technical and scientific texts.	☐	☐	☐
10.4 I read novels.	☐	☐	☐
10.5 I read non-fiction texts (e.g. essays).	☐	☐	☐
10.6 I read newspapers.	☐	☐	☐
10.7 I read magazines.	☐	☐	☐
10.8. I read texts in the internet.	☐	☐	☐
10.9 I read poetry.	☐	☐	☐

11. Can you name the three last texts in English you read?

12. What sort of texts do you read in English for your studies (and work)?

	a lot	a few	very occasionally
12.1 Textbooks recommend by teachers	☐	☐	☐
12.2 Research articles	☐	☐	☐
12.3 Technical books	☐	☐	☐
12.4 Scientific books	☐	☐	☐
12.5 Conference proceedings	☐	☐	☐
12.6 Theses and dissertations	☐	☐	☐

12.7 Other (please specify) ____________________

If you are also working please answer question **13**.

13. What type of texts do you read in English for your work and how often?

	a lot	a few	very occasionally
13.1 Research articles	☐	☐	☐
13.2 Technical books	☐	☐	☐
13.3 Scientific books	☐	☐	☐
13.4 Conference proceedings	☐	☐	☐
13.5 Theses and dissertations	☐	☐	☐
13.6 Formal letters	☐	☐	☐
13.7 Project proposals	☐	☐	☐

13.8 Other (please specify) ______________________________

14. Do you write texts in English? Please tick (✓) one box.

YES ☐ NO ☐

If you answered **yes** to the previous question, please answer question **15.**
If you answered **no** to the previous question, please go directly to question **18.**

15. How do you rate your written English language competence? Please tick (✓) one box.

	easily	with some difficulty	with great difficulty
15.1 I write simple everyday texts	☐	☐	☐
15.2 I write technical and scientific texts	☐	☐	☐
15.3 I write formal letters	☐	☐	☐
15.4 I write project proposals	☐	☐	☐

15.5 Other (please specify) ______________________________

16. Have you written in English recently (not including English classes assignments)? Please tick (✓) one box.

YES ☐ NO ☐

If you answered **no** to the previous question please go directly to question **18**.

17. What have you written in English? Please tick (✓) one or more boxes.

17.1 The abstract of your final research project (3rd year) ☐

17.2 Abstracts of research articles ☐

17.3 Abstracts of papers presented at conferences ☐

17.4 Research articles published in journals ☐

17.5 Papers presented at conferences ☐

17.6 Formal letters at work ☐

17.7 Other (please specify) ______________________________

18. Is there anything else of relevance you would like to add?

If you did not complete this questionnaire in a lecture or tutorial, please hand it into **Isabel Oliveira** (the teacher responsible for the English Course) or to **Eduarda Rodrigues** (the librarian) or leave it in their pigeonholes **by the 27th of December**. Thank you for your help!

Lecturers' Questionnaire - Part 2 (December 1999)

Dear Colleague,

If you are interested in attending an English course on reading in the next academic year, please complete part 2 of the questionnaire.

NAME ______________________________

DEPARTMENT ______________________________

Course(s) taught ______________________________

1. If you read or read and write in English but think that you need some improvement, would you be willing to attend a course aiming at improving reading skills in English in the next academic year? Please tick (✓) one box.

YES ☐ NO ☐

If you answered **<u>yes</u>** to the previous question, please answer the following questions.

2. Would you prefer the course to take place in the:
   Please tick (✓) one box.

   2.1 First semester (academic year 2000/01) ☐

   2.2 Second semester (academic year 2000/01) ☐

3. How many hours per week would you be able to attend:
   Please tick (✓) one box.

   3.1 Two hours ☐

   3.2 Three hours ☐

   3.3 Four hours ☐

   3.4 Five hours ☐

   3.5 More than five hours ☐

4. What time would you prefer to attend the course:
Please tick (✓) one or more boxes.

4.1 After 6.00 p.m. ☐

4.2 Before 6.00 p.m. ☐

4.3 At 8.00 a.m. ☐

4.4 On Saturdays ☐

4.5 Suggestions ______________________________

5. Would you be willing to give a copy of some of the texts you have written in English?
Please tick (✓) one box.

YES ☐ NO ☐

If you answered **<u>yes</u>** to the previous question, please answer question **6.**

6. I am willing to give a copy of:
Please tick (✓) one or more boxes.
(Please <u>give</u> the text(s) either to **Isabel Oliveira** or **Isabel Rodrigues**)

6.1 An abstract of a research article ☐

6.2 An abstract of a conference paper ☐

6.3 A research article published in a journal ☐

6.4 A conference paper ☐

6.5 The abstract of your MSc dissertation ☐

6.6 The abstract of your PhD ☐

6.7 A project proposal ☐

6.8 A formal letter ☐

6.9 Other (please specify) ______________________________

7. Is there anything else you think is relevant you would like to add?

Telephone (work – direct line)____________________

Email (work)________________________ Email __________________________

Telephone ____________________ Mobile phone __________________________

Please give the questionnaire to either **Eduarda Rodrigues** or **Isabel Oliveira** or leave it in their pigeonholes **by the 27th of December**. Thank you for your help!

If you feel you need to contact me my email address is:
isabel@figueiredosilva.fsnet co.uk

I would like to have a short meeting with those interested in attending the course on Wednesday **5th of January** in Room **98** at **4 p.m.**, as I will be in Castelo Branco during the first week of January. See you soon!

Students' Questionnaire - Part 2 (December 1999)

Dear Student,

If you are interested in attending an English course on reading in the next academic year, please complete part 2 of the questionnaire.

NAME ____

COURSE ____

Year of the course you are attending this academic year. Please tick (✓) one box.

3rd year ☐ 4th year ☐ 5th year ☐

1. If you read or read and write in English but think that you need some improvement, would you be willing to attend a course aiming at improving reading skills in English in the next academic year? Please tick (✓) one box.

YES ☐ NO ☐

If you answered <u>**yes**</u> to the previous question, please answer the following questions.

2. Would you prefer the course to take place in the:
   Please tick (✓) one box.

   2.1 First semester (academic year 2000/01) ☐

   2.2 Second semester (academic year 2000/01) ☐

3. How many hours per week would you be able to attend:
   Please tick (✓) one box.

   3.1 Two hours ☐

   3.2 Three hours ☐

   3.3 Four hours ☐

   3.4 Five hours ☐

   3.5 More than five hours ☐

4. What time would you prefer to attend the course:
Please tick (✓) one or more boxes.

4.1 After 6.00 p.m. ☐

4.2 Before 6.00 p.m. ☐

4.3 At 8.00 a.m. ☐

4.4 On Saturdays ☐

4.5 Suggestions ____

5. Would you be willing to give a copy of some of the texts you have written in English?
Please tick (✓) one box.

YES ☐ NO ☐

If you answered **yes** to the previous question, please answer question **6**.

6. I am willing to give a copy of:
Please tick (✓) one or more boxes.
(Please give the text either to **Isabel Oliveira** or **Eduarda Rodrigues**)

6.1 The abstract of your final research project (3rd year) ☐

6.2 An abstract of a research article ☐

6.3 An abstract of a conference paper ☐

6.4 A research article published in a journal ☐

6.5 A conference paper ☐

6.6 A formal letter ☐

6.7 A project proposal ☐

6.8 Other (please specify) ________________________________

7. Is there anything else you think is relevant you would like to add?

Address____

____

Telephone ____________________ Mobile phone ___________________________

Email ____________________________

Telephone (work)___________________ Email (work)________________________

If you did not complete this questionnaire in a lecture or tutorial, please hand it into **Isabel Oliveira** Room **101** (the teacher responsible for English courses) or to **Eduarda Rodrigues** (the librarian) or leave it in their pigeonholes **by the 27th of December**. Thank you for your help!

If you feel you need to contact me my email address is:
isabel@figueiredosilva.fsnet co.uk

I would like to have a short meeting with those interested in attending the course on Wednesday **5th of January** in Room **98** at **2 p.m.**, as I will be in Castelo Branco during the first week of January. See you soon!

APPENDIX 4

Results: Questionnaire (December 1999)

Results: Lecturers' Questionnaire - Part 1 (December 1999)

STATISTIQUES USUELLES DES VARIABLES

TRIS A PLAT DES VARIABLES NOMINALES

1 . Years of English in secondary school

	EFFECTIFS ABSOLU	%/TOTAL	%/EXPR.	HISTOGRAMME DES POIDS
ano1 - 1 year	0	0.00	0.00	*
ano2 - 2 years	3	7.50	7.89	****
ano3 - 3 years	19	47.50	50.00	************************
ano4 - 4 years	3	7.50	7.89	****
ano5 - 5 years	7	17.50	18.42	*********
ano6 - 6 years	2	5.00	5.26	***
ano7 - 7 years	3	7.50	7.89	****
ano8 - 8 years	1	2.50	2.63	**
TOTAL	38	95.00	100.00	

2 . Attendance of a language institute

	EFFECTIFS ABSOLU	%/TOTAL	%/EXPR.	HISTOGRAMME DES POIDS
ins1 - No	21	52.50	52.50	*************************
ins2 - Yes	19	47.50	47.50	**********************
TOTAL	40	100.00	100.00	

3 . Years in a language institute

	EFFECTIFS ABSOLU	%/TOTAL	%/EXPR.	HISTOGRAMME DES POIDS
ano1 - 1 year	3	7.50	15.79	********
ano2 - 2 years	4	10.00	21.05	**********
ano3 - 3 years	2	5.00	10.53	*****
ano4 - 4 years or more	5	12.50	26.32	*************
ano0 - Less than 1 year	5	12.50	26.32	*************
TOTAL	19	47.50	100.00	

4 . Whether the respondent lived in an English speaking country.

	EFFECTIFS ABSOLU	%/TOTAL	%/EXPR.	HISTOGRAMME DES POIDS
viv1 - No	30	75.00	75.00	***********************************
viv2 - Yes	10	25.00	25.00	************
TOTAL	40	100.00	100.00	

4a . Which country?

	EFFECTIFS ABSOLU	%/TOTAL	%/EXPR.	HISTOGRAMME DES POIDS
pai1 - Australia	1	2.50	12.50	******
pai2 - USA	1	2.50	12.50	******
pai3 - England	1	2.50	12.50	******
pai4 - United Kingdom	5	12.50	62.50	*****************************
TOTAL	8	20.00	100.00	

5 . How many years the respondent lived in an English speaking country.

	EFFECTIFS ABSOLU	%/TOTAL	%/EXPR.	HISTOGRAMME DES POIDS
ano1 - 1 year	3	7.50	37.50	******************
ano2 - 2 years	1	2.50	12.50	******
ano3 - 3 years	2	5.00	25.00	************
ano4 - 4 years or more	0	0.00	0.00	*
ano0 - Less than 1 year	2	5.00	25.00	************
TOTAL	8	20.00	100.00	

6 . Whether the respondent studied in an English speaking country.

	EFFECTIFS ABSOLU	%/TOTAL	%/EXPR.	HISTOGRAMME DES POIDS
est1 - No	32	80.00	80.00	*************************************
est2 - Yes	8	20.00	20.00	**********
TOTAL	40	100.00	100.00	

6a . Which country?

	EFFECTIFS ABSOLU	%/TOTAL	%/EXPR.	HISTOGRAMME DES POIDS
pai1 - Australia	1	2.50	12.50	******
pai2 - England	3	7.50	37.50	******************
pai3 - United Kingdom	4	10.00	50.00	************************
TOTAL	8	20.00	100.00	

7 . How many years the respondent studied in an English speaking country.

ano1 - 1	3	7.50	37.50	******************
ano2 - 2	1	2.50	12.50	******
ano3 - 3	0	0.00	0.00	*
ano4 - 4 years or more	2	5.00	25.00	************
ano0 - Less than 1 year	2	5.00	25.00	************
TOTAL	8	20.00	100.00	

8 . Texts read in English

lei1 - No	1	2.50	2.50	**
lei2 - Yes	39	97.50	97.50	***
TOTAL	40	100.00	100.00	

9.1 Rating: reading simple texts

cap1 - With some difficulty	3	7.50	7.50	****
cap2 - Easily	34	85.00	85.00	**
cap3 - NO ANSWER	3	7.50	7.50	****
TOTAL	40	100.00	100.00	

9.2 Rating: reading advanced textbooks

cap1 - With some difficulty	19	47.50	47.50	************************
cap2 - With great difficulty	4	10.00	10.00	*****
cap3 - Easily	14	35.00	35.00	******************
cap4 - NO ANSWER	3	7.50	7.50	****
TOTAL	40	100.00	100.00	

9.3 Rating: reading technical and scientific texts

cap1 - With some difficulty	18	45.00	45.00	***********************
cap2 - Easily	22	55.00	55.00	****************************
TOTAL	40	100.00	100.00	

9.4 Rating: reading fiction

cap1 - With some difficulty	14	35.00	35.00	******************
cap2 - With great difficulty	7	17.50	17.50	*********
cap3 - Easily	7	17.50	17.50	*********
cap4 - NO ANSWER	12	30.00	30.00	***************
TOTAL	40	100.00	100.00	

9.5 Rating: reading non-fiction

cap1 - With some difficulty	14	35.00	35.00	******************
cap2 - With great difficulty	8	20.00	20.00	**********
cap3 - Easily	5	12.50	12.50	******
cap4 - NO ANSWER	13	32.50	32.50	****************
TOTAL	40	100.00	100.00	

9.6 Rating: reading newspapers

cap1 - With some difficulty	10	25.00	25.00	*************
cap2 - With great difficulty	1	2.50	2.50	**
cap3 - Easily	18	45.00	45.00	***********************
cap4 - NO ANSWER	11	27.50	27.50	**************
TOTAL	40	100.00	100.00	

9.7 Rating: reading magazines

cap1 - With some difficulty	12	30.00	30.00	***************
cap2 - Easily	21	52.50	52.50	***************************
cap3 - NO ANSWER	7	17.50	17.50	*********
TOTAL	40	100.00	100.00	

9.8 Rating: reading texts in the Internet

cap1 - With some difficulty	10	25.00	25.00	*************
cap2 - Easily	29	72.50	72.50	*************************************
cap3 - NO ANSWER	1	2.50	2.50	**
TOTAL	40	100.00	100.00	

9.9 Rating: reading poetry

cap1 - With some difficulty	11	27.50	27.50	**************
cap2 - With great difficulty	13	32.50	32.50	****************
cap3 - Easily	1	2.50	2.50	**
cap4 - NO ANSWER	15	37.50	37.50	*******************
TOTAL	40	100.00	100.00	

11.1 Frequency: reading textbooks

txt1 - A lot	26	65.00	65.00	*********************************
txt2 - NO ANSWER	2	5.00	5.00	***
txt3 - A few	7	17.50	17.50	*********
txt4 - Very occasionally	5	12.50	12.50	******
TOTAL	40	100.00	100.00	

11.2 Frequency: reading research articles

txt1 - A lot	29	72.50	72.50	******************************
txt2 - A few	9	22.50	22.50	**********
txt3 - Very occasionally	2	5.00	5.00	***
TOTAL	40	100.00	100.00	

11.3 Frequency: reading technical books

txt1 - A lot	31	77.50	77.50	********************************
txt2 - A few	8	20.00	20.00	*********
txt3 - Very occasionally	1	2.50	2.50	**
TOTAL	40	100.00	100.00	

11.4 Frequency: reading scientific books

txt1 - A lot	31	77.50	77.50	********************************
txt2 - NO ANSWER	1	2.50	2.50	**
txt3 - A few	5	12.50	12.50	******
txt4 - Very occasionally	3	7.50	7.50	****
TOTAL	40	100.00	100.00	

11.5 Frequency: reading conference proceedings

txt1 - A lot	21	52.50	52.50	**********************
txt2 - NO ANSWER	2	5.00	5.00	***
txt3 - A few	14	35.00	35.00	***************
txt4 - Very occasionally	3	7.50	7.50	****
TOTAL	40	100.00	100.00	

11.6 Frequency: reading theses and dissertations

txt1 - A lot	4	10.00	10.00	*****
txt2 - NO ANSWER	4	10.00	10.00	*****
txt3 - A few	14	35.00	35.00	***************
txt4 - Very occasionally	18	45.00	45.00	*******************
TOTAL	40	100.00	100.00	

11.7 Frequency: reading formal letters

txt1 - A lot	2	5.00	5.00	***
txt2 - NO ANSWER	6	15.00	15.00	*******
txt3 - A few	13	32.50	32.50	**************
txt4 - Very occasionally	19	47.50	47.50	********************
TOTAL	40	100.00	100.00	

11.8 Frequency: reading project proposals

txt1 - A lot	6	15.00	15.00	*******
txt2 - NO ANSWER	7	17.50	17.50	********
txt3 - A few	11	27.50	27.50	************
txt4 - Very occasionally	16	40.00	40.00	*****************
TOTAL	40	100.00	100.00	

11.9 Frequency: reading other texts

txt1 -	1	2.50	33.33	**************
txt2 - Websites	1	2.50	33.33	**************
txt3 -Internet information	1	2.50	33.33	**************
TOTAL	3	7.50	100.00	

12.1 Textbooks recommended to students

txt1 - A lot	11	27.50	27.50	************
txt2 - NO ANSWER	8	20.00	20.00	*********
txt3 - A few	13	32.50	32.50	**************
txt4 - Very occasionally	8	20.00	20.00	*********
TOTAL	40	100.00	100.00	

12.2 Research articles recommended to students

txt1 - A lot	5	12.50	12.50	******
txt2 - NO ANSWER	7	17.50	17.50	********
txt3 - A few	17	42.50	42.50	******************
txt4 - Very occasionally	11	27.50	27.50	************
TOTAL	40	100.00	100.00	

12.3 Technical books recommended to students

txt1 - A lot	15	37.50	37.50	****************
txt2 - NO ANSWER	3	7.50	7.50	****
txt3 - A few	12	30.00	30.00	*************
txt4 - Very occasionally	10	25.00	25.00	***********
TOTAL	40	100.00	100.00	

12.4 Scientific books recommended to students

txt1 - A lot	11	27.50	27.50	************
txt2 - NO ANSWER	6	15.00	15.00	*******
txt3 - A few	13	32.50	32.50	**************
txt4 - Very occasionally	10	25.00	25.00	***********
TOTAL	40	100.00	100.00	

12.5 Conference proceedings recommended to students

txt1 - A lot	1	2.50	2.50	**
txt2 - NO ANSWER	10	25.00	25.00	************
txt3 - A few	11	27.50	27.50	*************
txt4 - Very occasionally	18	45.00	45.00	*********************
TOTAL	40	100.00	100.00	

12.6 Theses and dissertations recommended to students

txt1 - NO ANSWER	12	30.00	30.00	**************
txt2 - A few	3	7.50	7.50	****
txt3 - Very occasionally	25	62.50	62.50	*****************************
TOTAL	40	100.00	100.00	

12.7 Other texts recommended to students

txt1 - Monolingual dictionaries	1	2.50	25.00	************
txt2 - Does not recommend books	1	2.50	25.00	************
txt3 - Technical journals	1	2.50	25.00	************
txt4 - Webpage	1	2.50	25.00	************
TOTAL	4	10.00	100.00	

13 . Differences in recommended bibliography

dif1 - No	13	32.50	32.50	***************
dif2 - Yes	27	67.50	67.50	*******************************
TOTAL	40	100.00	100.00	

15 . Writing: texts in English

esc1 - No	12	30.00	30.00	**************
esc2 - Yes	28	70.00	70.00	*********************************
TOTAL	40	100.00	100.00	

16.1 Writing: simple texts

esc1 - With some difficulty	10	25.00	25.00	************
esc2 - With great difficulty	2	5.00	5.00	***
esc3 - Easily	15	37.50	37.50	******************
esc4 - NO ANSWER	13	32.50	32.50	***************
TOTAL	40	100.00	100.00	

16.2 Writing: technical and scientific texts

esc1 - With some difficulty	21	52.50	52.50	*************************
esc2 - With great difficulty	3	7.50	7.50	****
esc3 - Easily	4	10.00	10.00	*****
esc4 - NO ANSWER	12	30.00	30.00	**************
TOTAL	40	100.00	100.00	

16.3 Writing: formal letters

esc1 - With some difficulty	13	32.50	32.50	***************
esc2 - With great difficulty	4	10.00	10.00	*****
esc3 - Easily	8	20.00	20.00	**********
esc4 - NO ANSWER	15	37.50	37.50	******************
TOTAL	40	100.00	100.00	

16.4 Writing: project proposals

esc1 - With some difficulty	12	30.00	30.00	**************
esc2 - With great difficulty	4	10.00	10.00	*****
esc3 - Easily	2	5.00	5.00	***
esc4 - NO ANSWER	22	55.00	55.00	**************************
TOTAL	40	100.00	100.00	

17 . Writing: texts for academic work

esc1 - NO ANSWER	14	35.00	35.00	*****************
esc2 - Yes	26	65.00	65.00	******************************
TOTAL	40	100.00	100.00	

18.1 Writing: research articles abstracts

esc1 - NO ANSWER	20	50.00	50.00	************************
esc2 - Yes	20	50.00	50.00	************************
TOTAL	40	100.00	100.00	

18.2 Writing: conference papers abstracts

esc1 - NO ANSWER	18	45.00	45.00	*********************
esc2 - Yes	22	55.00	55.00	**************************
TOTAL	40	100.00	100.00	

18.3 Writing: research articles

esc1 - NO ANSWER	25	62.50	62.50	*****************************
esc2 - Yes	15	37.50	37.50	******************
TOTAL	40	100.00	100.00	

18.4 Writing: conference papers

esc1 - NO ANSWER	23	57.50	57.50	***************************
esc2 - Yes	17	42.50	42.50	********************
TOTAL	40	100.00	100.00	

18.5 Writing: MSc abstract

esc1 - NO ANSWER	20	50.00	50.00	***********************
esc2 - Yes	20	50.00	50.00	***********************
TOTAL	40	100.00	100.00	

18.6 Writing: MSc dissertation

esc1 - NO ANSWER	36	90.00	90.00	***
esc2 - Yes	4	10.00	10.00	*****
TOTAL	40	100.00	100.00	

18.7 Writing: PhD abstract

esc1 - NO ANSWER	36	90.00	90.00	***
esc2 - Yes	4	10.00	10.00	*****
TOTAL	40	100.00	100.00	

18.8 Writing: PhD thesis

esc1 - NO ANSWER	34	85.00	85.00	***************************************
esc2 - Yes	6	15.00	15.00	*******
TOTAL	40	100.00	100.00	

18.9 Writing: project proposals

esc1 - NO ANSWER	32	80.00	80.00	************************************
esc2 - Yes	8	20.00	20.00	**********
TOTAL	40	100.00	100.00	

18.10 Writing: formal letters

esc1 - NO ANSWER	30	75.00	75.00	**********************************
esc2 - Yes	10	25.00	25.00	************
TOTAL	40	100.00	100.00	

18.11 Writing: other texts

esc1 - Horticulture leaflets	1	2.50	50.00	***********************
esc2 - Emails	1	2.50	50.00	***********************
TOTAL	2	5.00	100.00	

Results: Lecturers' Questionnaire - Part 2 (December 1999)

STATISTIQUES USUELLES DES VARIABLES

TRIS A PLAT DES VARIABLES NOMINALES

	EFFECTIFS ABSOLU	%/TOTAL	%/EXPR.	HISTOGRAMME DES POIDS
1 . Course on reading				
TOTAL of answers		30		
2 . Semestre preference for the course				
sem1 - 1	14	46.67	48.28	***********************
sem2 - 2	15	50.00	51.72	************************
TOTAL	29	96.67	100.00	
3 . Number of hours preference				
hor1 - 1	8	26.67	26.67	*************
hor2 - 2	12	40.00	40.00	*******************
hor3 - 3	8	26.67	26.67	*************
hor4 - 4	0	0.00	0.00	*
hor5 - 5	2	6.67	6.67	****
TOTAL	30	100.00	100.00	
4 . Timetable preference(s)[1]				
hor1 - 1	13	43.33	43.33	********************
hor2 - 2	15	50.00	50.00	************************
hor3 - 3	2	6.67	6.67	****
TOTAL	30	100.00	100.00	

Results in percentage:

5 . Willingness to give text(s) written in English	
txt1 - Yes	80%
6.1 An abstract of a research article	
txt1 - Yes	26.67%
6.2 An abstract of a conference paper	
txt1 - Yes	26.67%
6.3 A research article	
txt1 - Yes	13.3
6.4 A conference paper	
txt1 - Yes	20%
6.5 The abstract of your MSc dissertation	
txt1 - Yes	33.33%
6.6 The abstract of your PhD	
txt1 - Yes	6.67%
6.7 A project proposal	
txt1 - Yes	0%
6.8 A formal letter	
txt1 - Yes	6.67%
6.9 Other (non specified)	
txt1 - Yes	6.67%

[1]most respondents only chose one option, therefore only the first option was considered.

Results: Students' Questionnaire - Part 1 (December 1999)

STATISTIQUES USUELLES DES VARIABLES

TRIS A PLAT DES VARIABLES NOMINALES

	EFFECTIFS ABSOLU	EFFECTIFS %/TOTAL	EFFECTIFS %/EXPR.	HISTOGRAMME DES POIDS
. Course attended at the College of Agriculture				
cur1 - Agriculture	84	30.43	30.55	***************
cur2 - Animal	79	28.62	28.73	**************
cur3 - Forestry	63	22.83	22.91	***********
cur4 - M. Natural Resources	49	17.75	17.82	*********
TOTAL	275	99.64	100.00	
. Year of the course this academic year				
ano3 - 3rd year	102	36.96	36.96	*****************
ano4 - 4th year	135	48.91	48.91	***********************
ano5 - 5th year	39	14.13	14.13	*******
TOTAL	276	100.00	100.00	
1 . Years of English in secondary school				
MO00 - No answer	3	1.09	1.09	*
MO01 - 1 year	0	0.00	0.00	*
MO02 - 2 years	10	3.62	3.62	**
MO03 - 3 years	84	30.43	30.43	**************
MO04 - 4 years	6	2.17	2.17	*
MO05 - 5 years	78	28.26	28.26	**************
MO06 - 6 years	14	5.07	5.07	***
MO08 - 7 years	71	25.72	25.72	************
MO08 - 8 years	10	3.62	3.62	**
TOTAL	276	100.00	100.00	
2 . Attendance of a language institute				
ins1 - Yes	16	5.80	5.80	***
ins2 - No	260	94.20	94.20	**
TOTAL	276	100.00	100.00	
3 . Years in a language institute				
MO00 - No answer	260	94.20	94.55	**
MO01 - 1 year	4	1.45	1.45	*
MO02 - 2 years	5	1.81	1.82	*
MO03 - 3 years	3	1.09	1.09	*
MO04 - 4 years	2	0.72	0.73	*
MO05 - 5 years	1	0.36	0.36	*
TOTAL	275	99.64	100.00	
4 . Whether the respondent lived in an English speaking country.				
viv1 - Yes	3	1.09	1.09	*
viv2 - No	273	98.91	98.91	**
TOTAL	276	100.00	100.00	
4a . Which country?				
pai1 - Canada	1	0.36	33.33	****************
pai2 - England	1	0.36	33.33	****************
pai3 - USA	1	0.36	33.33	****************
TOTAL	3	1.09	100.00	
5 . How many years the respondent lived in an English speaking country.				
MO00 - No answer	273	98.91	98.91	**
MO01 - 1 year	0	0.00	0.00	*
MO02 - 2 years	0	0.00	0.00	*
MO03 - 3 years	0	0.00	0.00	*
MO04 - 4 years	1	0.36	0.36	*
MO05 - less than an year	2	0.72	0.72	*
TOTAL	276	100.00	100.00	
6 . Whether the respondent studied in an English speaking country				
est1 - Yes	1	0.36	0.36	*
est2 - No	275	99.64	99.64	**
TOTAL	276	100.00	100.00	
7 . How many years the respondent studied in an English speaking country.				
MO01 - No answer	275	99.64	99.64	**
MO06 - 5 years	1	0.36	0.36	*
TOTAL	276	100.00	100.00	

8 . English course attended at the College of Agriculture

AA_1 - Beginners	90	32.61	32.85	****************
AA_2 - Intermediate	116	42.03	42.34	*********************
AA_3 - Post-intermediate	68	24.64	24.82	************
TOTAL	274	99.28	100.00	

9.1 Whether the respondent can read texts in English

lei1 - Yes	215	77.90	77.90	***************************************
lei2 - No	61	22.10	22.10	***********
TOTAL	276	100.00	100.00	

9.2 How often the respondent reads texts in English

lei1 - Never	5	1.81	2.31	**
lei2 - Seldom	95	34.42	43.98	**********************
lei3 - Sometimes	92	33.33	42.59	*********************
lei4 - Often	22	7.97	10.19	*****
lei5 - Constantly	2	0.72	0.93	*
TOTAL	216	78.26	100.00	

10.1 . Rating: reading simple texts

cap1 - Easily	136	49.28	67.33	**********************************
cap2 - With some difficulty	61	22.10	30.20	***************
cap3 - With great difficulty	5	1.81	2.48	**
TOTAL	202	73.19	100.00	

10.2 Rating: reading advanced textbooks

cap1 - Easily	8	2.90	4.35	**
cap2 - With some difficulty	86	31.16	46.74	***********************
cap3 - With great difficulty	90	32.61	48.91	************************
TOTAL	184	66.67	100.00	

10.3 Rating: reading technical and scientific texts

cap1 - Easily	16	5.80	7.69	****
cap2 - With some difficulty.	109	39.49	52.40	**************************
cap3 - With great difficulty	83	30.07	39.90	********************
TOTAL	208	75.36	100.00	

10.4 . Rating: reading fiction

cap1 - Easily	42	15.22	25.45	************
cap2 - With some difficulty.	73	26.45	44.24	**********************
cap3 - With great difficulty	50	18.12	30.30	***************
TOTAL	165	59.78	100.00	

10.5 Rating: reading non-fiction

cap1 - Easily	20	7.25	12.50	******
cap2 - With some difficulty	83	30.07	51.88	**************************
cap3 - With great difficulty	57	20.65	35.62	******************
TOTAL	160	57.97	100.00	

10.6 Rating: reading newspapers

cap1 - Easily	67	24.28	40.12	********************
cap2 - With some difficulty	81	29.35	48.50	************************
cap3 - With great difficulty	19	6.88	11.38	******
TOTAL	167	60.51	100.00	

10.7 Rating: reading magazines

cap1 - Easily	85	30.80	44.50	**********************
cap2 - With some difficulty	92	33.33	48.17	************************
cap3 - With great difficulty	14	5.07	7.33	****
TOTAL	191	69.20	100.00	

10.8 Rating: reading texts in the Internet

cap1 - Easily	86	31.16	43.22	**********************
cap2 - With some difficulty	98	35.51	49.25	*************************
cap3 - With great difficulty	15	5.43	7.54	****
TOTAL	199	72.10	100.00	

10.9 Rating: reading poetry

cap1 - Easily	16	5.80	10.39	*****
cap2 - With some difficulty	57	20.65	37.01	*******************
cap3 - With great difficulty	81	29.35	52.60	**************************
TOTAL	154	55.80	100.00	

12.1 Frequency: reading textbooks

txt1 - A lot	40	14.49	19.70	**********
txt2 - A few	120	43.48	59.11	******************************
txt3 - Very occasionally	43	15.58	21.18	**********
TOTAL	203	73.55	100.00	

12.2 Frequency: reading research articles

txt1 - A lot	29	10.51	15.18	*******
txt2 - A few	88	31.88	46.07	***********************
txt3 - Very occasionally	74	26.81	38.74	*******************
TOTAL	191	69.20	100.00	

12.3 Frequency: reading technical books

txt1 - A lot	23	8.33	12.50	******
txt2 - A few	82	29.71	44.57	**********************
txt3 - Very occasionally	79	28.62	42.93	*********************
TOTAL	184	66.67	100.00	

12.4 . Frequency: reading scientific books

txt1 - A lot	11	3.99	6.40	***
txt2 - A few	70	25.36	40.70	********************
txt3 - Very occasionally	91	32.97	52.91	**************************
TOTAL	172	62.32	100.00	

12.5 Frequency: reading conference proceedings

txt1 - A lot	8	2.90	4.82	***
txt2 - A few	49	17.75	29.52	**************
txt3 - Very occasionally	109	39.49	65.66	********************************
TOTAL	166	60.14	100.00	

12.6 Frequency: reading theses and dissertations

txt1 - A lot	1	0.36	0.68	*
txt2 - A few	30	10.87	20.41	**********
txt3 - Very occasionally	116	42.03	78.91	***************************************
TOTAL	147	53.26	100.00	

12.7 Frequency: reading other texts

txt1 - Other texts (lecturers)	1	0.36	12.50	******
txt2 - Internet	4	1.45	50.00	*************************
txt3 - Lecturers' handouts	1	0.36	12.50	******
txt4 - Only compulsory texts	1	0.36	12.50	******
txt5 - Websites	1	0.36	12.50	******
TOTAL	8	2.90	100.00	

13.1 Frequency: reading research articles (students who work)

txt1 - A lot	4	1.45	12.12	******
txt2 - A few	17	6.16	51.52	*************************
txt3 - Very occasionally	12	4.35	36.36	******************
TOTAL	33	11.96	100.00	

13.2 Frequency: reading technical books (students who work)

txt1 - A lot	7	2.54	21.88	***********
txt2 - A few	12	4.35	37.50	******************
txt3 - Very occasionally	13	4.71	40.62	********************
TOTAL	32	11.59	100.00	

13.3 Frequency: reading scientific books (students who work)

txt1 - A lot	2	0.72	7.69	****
txt2 - A few	12	4.35	46.15	***********************
txt3 - Very occasionally	12	4.35	46.15	***********************
TOTAL	26	9.42	100.00	

13.4 Frequency: reading conference proceedings (students who work)

txt1 - A lot	2	0.72	8.00	****
txt2 - A few	5	1.81	20.00	**********
txt3 - Very occasionally	18	6.52	72.00	************************************
TOTAL	25	9.06	100.00	

13.5 Frequency: reading theses and dissertations (students who work)

txt1 - A lot	0	0.00	0.00	*
txt2 - A few	5	1.81	19.23	*********
txt3 - Very occasionally	21	7.61	80.77	**
TOTAL	26	9.42	100.00	

13.6 Frequency: reading formal letters (students who work)

txt1 - A lot	1	0.36	4.00	**
txt2 - A few	7	2.54	28.00	**************
txt3 - Very occasionally	17	6.16	68.00	**********************************
TOTAL	25	9.06	100.00	

13.7 Frequency: reading project proposals (students who work)

txt1 - A lot	2	0.72	8.33	****
txt2 - A few	2	0.72	8.33	****
txt3 - Very occasionally	20	7.25	83.33	***
TOTAL	24	8.70	100.00	

13.8 Frequency: reading other texts (students who work)

txt1 - ?	1	0.36	33.33	****************

txt2 - Instruction Manuals	1	0.36	33.33	*****************
txt3 - Articles in the Internet	1	0.36	33.33	*****************
TOTAL	3	1.09	100.00	

14 . Whether the respondent can write texts in English

esc1 - Yes	38	13.77	13.77	*******
esc2 - No	238	86.23	86.23	**
TOTAL	276	100.00	100.00	

15.1 Writing: simple texts

esc1 - Easily	26	9.42	50.00	*************************
esc2 - With some difficulty	17	6.16	32.69	*****************
esc3 - With great difficulty	9	3.26	17.31	*********
TOTAL	52	18.84	100.00	

15.2 Writing: technical and scientific texts

esc1 - Easily	2	0.72	4.26	**
esc2 - With some difficulty	22	7.97	46.81	************************
esc3 - With great difficulty	23	8.33	48.94	*************************
TOTAL	47	17.03	100.00	

15.3 Writing: formal letters

esc1 - Easily	11	3.99	25.00	*************
esc2 - With some difficulty	14	5.07	31.82	****************
esc3 - With great difficulty	19	6.88	43.18	**********************
TOTAL	44	15.94	100.00	

15.4 Writing: project proposals

esc1 - Easily	0	0.00	0.00	*
esc2 - With some difficulty	15	5.43	36.59	*******************
esc3 - With great difficulty	26	9.42	63.41	********************************
TOTAL	41	14.86	100.00	

15.5 Writing: other texts

esc1 - Fiction	1	0.36	33.33	*****************
esc2 - Emails	1	0.36	33.33	*****************
esc3 - Poems	1	0.36	33.33	*****************
TOTAL	3	1.09	100.00	

16 Whether the respondent has written texts in English recently.

esc1 - Yes	19	6.88	6.88	****
esc2 - No	257	93.12	93.12	***
TOTAL	276	100.00	100.00	

17.1 Writing: final research project abstract (3rd year)

esc1 - Yes	22	7.97	7.97	****
esc2 - No	254	92.03	92.03	***
TOTAL	276	100.00	100.00	

17.2 Writing: research articles abstracts

esc1 - Yes	3	1.09	1.09	*
esc2 - No	273	98.91	98.91	**
TOTAL	276	100.00	100.00	

17.3 Writing: conference papers abstracts

esc1 - Yes	3	1.09	1.09	*
esc2 - No	273	98.91	98.91	**
TOTAL	276	100.00	100.00	

17.4 Writing: research articles

esc1 - Yes	2	0.72	0.72	*
esc2 - No	274	99.28	99.28	**
TOTAL	276	100.00	100.00	

17.5 Writing: conference papers

esc1 - Yes	2	0.72	0.72	*
esc2 - No	274	99.28	99.28	**
TOTAL	276	100.00	100.00	

17.6 Writing: formal letters

esc1 - Yes	5	1.81	1.81	*
esc2 - No	271	98.19	98.19	**
TOTAL	276	100.00	100.00	

17.7 Writing: other texts

esc1 - Informal letters	1	0.36	20.00	**********
esc2 - Letters	1	0.36	20.00	**********
esc3 - Texts in the Internet	1	0.36	20.00	**********
esc4 - Emails	1	0.36	20.00	**********
esc5 - Final research project	1	0.36	20.00	**********
TOTAL	5	1.81	100.00	

Results: Students' Questionnaire - Part 2 (December 1999)

STATISTIQUES USUELLES DES VARIABLES

TRIS A PLAT DES VARIABLES NOMINALES

	------ EFFECTIFS -------			
	ABSOLU	%/TOTAL	%/EXPR.	HISTOGRAMME DES POIDS
1 . Course attended at the College of Agriculture				
cur1 - Agriculture	18	19.35	19.35	**********
cur2 - Animal	14	15.05	15.05	********
cur3 - Forestry	34	36.56	36.56	******************
cur4 - M. Natural Resources	27	29.03	29.03	***************
TOTAL	93	100.00	100.00	
2 . Year of the course this academic year				
ano3 - 3rd year	36	38.71	38.71	*******************
ano4 - 4th year	54	58.06	58.06	*****************************
ano5 - 5th year	3	3.23	3.23	**
TOTAL	93	100.00	100.00	
3 . Semestre preference for the course				
sem1 - 1st	68	73.12	76.40	**************************************
sem2 - 2nd	21	22.58	23.60	************
TOTAL	89	95.70	100.00	
4 . Number of hours preference				
hor1 - 2 hours	41	44.09	44.09	**********************
hor2 - 3 hours	30	32.26	32.26	****************
hor3 - 4 hours	18	19.35	19.35	**********
hor4 - 5 hours	4	4.30	4.30	**
TOTAL	93	100.00	100.00	
5 . Timetable preference(s)				
hor1 - After 18:00	36	38.71	38.71	*******************
hor2 - Before 18:00	39	41.94	41.94	*********************
hor3 - At 8:00	8	8.60	8.60	****
hor4 - On Saturdays	10	10.75	10.75	*****
TOTAL	93	100.00	100.00	
6 . Willing to give text(s) written in English				
txt1 - Yes	42	45.16	45.16	***********************
7 . Final research project abstract				
txt1 - Yes	30	32.26	32.26	****************
8 . Letter				
txt1 - Yes	3	3.23	3.23	**
9 . Other (non specified)				
txt1 - Yes	1	1.08	1.08	*

[1]most respondents only chose one option, therefore only the first option was considered.

APPENDIX 5

Students who completed the questionnaire (December 1999)

Course	Students enrolled	Students who are also working		Questionnaire: Part 1		Questionnaire: Part 2	
Agriculture	**175**	**69**	**39%**	**84**	**48%**	**18**	**10%**
Animal Production	**186**	**62**	**33%**	**79**	**42%**	**14**	**8%**
Forestry	**120**	**38**	**32%**	**63**	**53%**	**34**	**28%**
Natural Resources Management	**107**	**10**	**9%**	**49**	**46%**	**27**	**25%**
Total	**588**	**179**	**30%**	**275**	**47%**	**93**	**16%**

Details:

Year	Course	Class	No. of students	Questionnaire Part 1	Questionnaire Part 2
3^{rd}	Agriculture	**T1**	**57**	**22**	**3**
	Animal Production	**T2**	**61**	**16**	**3**
		T3		**13**	**8**
	Forestry	**T4**	**59**	**12**	**5**
		T5		**16**	**5**
	Natural Resources Management	**T6**	**43**	**22**	**12**
Total 3^{rd} year			**220**	**101**	**36**
4^{th}	Agriculture	**T1**	**88**	**21**	**8**
		T2		**23**	**5**
	Animal Production	**T3**	**87**	**21**	**2**
		T4		**9**	**1**
	Forestry	**T5**	**61**	**15**	**13**
		T6		**20**	**11**
	Natural Resources Management	**T7**	**64**	**17**	**12**
		T8		**10**	**3**
Total 4^{th} year			**300**	**136**	**55**
5^{th}	Agriculture	**T1**	**30**	**18**	**2**
	Animal Production	**T2**	**38**	**20**	**0**
Total 5^{th} year			**68**	**38**	**2**

APPENDIX 6

Course pre-tests

PRE-TESTS – TEST 1
(1 hora)

Leia o texto que se segue tirado da *Revista Portuguesa de Zootecnia*. **À medida que vai lendo** o artigo responda **em português** às perguntas de interpretação referentes a cada secção no espaço em branco a seguir à pergunta.

Este teste será classificado em função:
a) do tempo que demorar a fazê-lo
b) do número de respostas que completar

Este teste tem a duração máxima de 1 hora. Ao iniciar e ao terminar o teste assinale as horas na tabela abaixo de modo a que a duração do teste possa ser contabilizada.

	HORAS
INÍCIO DO TESTE	
FIM DO TESTE	

Outor-Monteiro, D., M.M. Gomes, V.M.C. Pinheiro and A. Dias-da-Silva. 1999. Efeito do tipo de comedouro em alguns parâmetros produtivos em suínos em crescimento. *Revista Portuguesa de Zootecnia*. 6.2: 125-132.

Efeito do tipo de comedouro em alguns parâmetros produtivos em suínos em crescimento.

Introdução

Sendo a alimentação o encargo principal de uma exploração suína, a rentabilidade desta depende muito da eficiência de utilização dos alimentos. Os porcos em crescimento/acabamento são frequentemente alimentados *ad libitum* até ao abate.

Os tipos de comedouro e bebedouro condicionam a apresentação do alimento e da água, influenciam o seu consumo e desperdício e, consequentemente, a eficiência do sistema. São múltiplos os tipos de bebedouros e comedouros e as formas de apresentação do alimento. O comedouro longo, onde se coloca água e alimento ou a mistura prévia e que permite o acesso simultâneo de todos os animais foi já de uso generalizado. Posteriormente, surgiu a alimentação no solo ou em comedouros colectivos (4-5 lugares) para alimento seco, com reservatório, que permite uma alimentação *ad libitum*. Neste caso a ingestão de água é feita em local distinto através de um bebedouro (Maton *et al.*, 1985).

Actualmente, existem comedouros individuais com reservatório de alimento e bebedouro incorporado, baseados todos em conceitos ergonómicos desenvolvidos por Baxter em 1989 (Walker, 1990b). Estes comedouros conferem protecção à cabeça e pescoço do animal enquanto se alimenta, o que minimiza as interacções conflituosas durante a ingestão, diminuindo o desperdício de alimento, sobretudo quando é apresentado na forma farinada e constitui assim uma alternativa à granulação (Patterson, 1989; Walker, 1990b). Embora individuais, permitem a alimentação de lotes de 10 a 20 animais sem interferência no comportamento alimentar dos porcos. Possuem um mecanismo que é accionado pelo animal dispensando por impulso quantidades variáveis de alimento que podem ser reguladas. Este alimento cai no comedouro propriamente dito, onde também está posicionado o bebedouro. Assim, e porque a água também cai no comedouro, o animal ingere um alimento em papa, não havendo tanto desperdício de água e reduz-se o volume de dejectos, (Fortune e Lebas, 1991; Mészáros *et al.*, 1994; Voermans *et al.*, 1994) e também de alimento (Baxter, 1989). Por outro lado, o alimento colocado à disposição dos animais é sempre proveniente do reservatório não tendo sofrido conspurcação anterior.

Alguns autores apontam ainda este tipo de comedouro como capaz de aumentar a ingestão e, consequentemente, o crescimento e espessura de gordura subcutânea quando comparados com os comedouros colectivos para alimento seco (Anderson *et al.*, 1990; Walker, 1990b). No entanto, segundo Kay *et al.* (1989) este tipo de comedouro não melhora o crescimento, o índice de conversão, o peso e o rendimento da carcaça, nem as medidas P1 + P3. A única vantagem apontada por este autor é o menor espaço ocupado pelo comedouro no parque. Whittemore (1993) aponta ainda como vantagens a diminuição do desperdício de alimento e das poeiras nas instalações.

O objectivo deste trabalho foi o de testar três sistemas de bebedouro/comedouro e apresentação do alimento usando uma dieta farinada, avaliando a sua influência nalgumas performances produtivas dos animais.

1. Quais são os sistemas de comedouro mais comuns?

Material e Métodos

A experiência consistiu em três tratamentos com comedouros envolvendo 90 animais. Para cada tratamento foram efectuadas três repetições. Foi realizada numa exploração comercial (Agro Pecuária da Gandra, Fradelos, Famalicão) e simulou os sistemas de alimentação aí utilizados.

Comedouros

O comedouro colectivo de alimentação seca – CS (multi-space hopper feeders), construído em fibrocimento, dispunha de reservatório de alimento para cerca de 50 kg. Possuía 80 cm de altura, 41 cm de largura e 120 cm de comprimento. A calha de alimentação estava dividida em 5 compartimentos de 22 cm cada. O fluxo de alimentação era regulado por um mecanismo de guilhotina.
O comedouro colectivo de alimentação húmida – CH (multi-space wet feeding in troughs), em forma de meia cana, construído em betão possuía 18 cm de altura, 35 cm de largura e um comprimento de 310 cm. Estava dividido em 10 locais o que permitia a alimentação simultânea dos 10 animais do parque. Neste tratamento, o alimento foi distribuído segundo o sistema 'wet-feeding', ou seja, foi colocada água no comedouro e o alimento sobre esta numa relação de 2:1. Os próprios animais efectuavam a mistura ingerindo uma alimentação em papa.

O comedouro individual de alimentação húmida – IH (single-space dry-wet hopper feeders), era construído em chapa de aço inoxidável e tinha 100 cm de altura, 34 cm de largura e 37 cm de profundidade e bebedouro incorporado. Dispunha de um reservatório que comportava cerca de 30 kg de alimento. O fluxo de alimento desde o reservatório até à calha de alimentação era feito por iniciativa e acção do animal, accionando uma patilha doseadora regulável. Esta regulação permitia-nos fazer variar a quantidade de alimento dispensado por cada impulso. Este comedouro permite apenas que um porco se alimente de cada vez (single-space), mas devido à sua profundidade e às paredes laterais confere protecção da região da cabeça e pescoço ao animal que está a usá-lo, permitindo que ele se alimente com algum sossego.

Para além do bebedouro incorporado, os animais do tratamento IH, dispunham ainda de um segundo bebedouro. Isto inviabiliza desde logo uma das grandes vantagens deste comedouro que é a redução dos gastos de água e a diminuição do volume de dejectos produzidos. Mas, neste trabalho, pretendíamos sobretudo avaliar o efeito do comedouro na produtividade zootécnica e tendo o ensaio decorrido no Verão, a existência de um único ponto de abeberamento poderia restringir o acesso dos animais à água e distorcer as suas performances.

2. Quantas repetições de cada tratamento foram feitas?

3. Quantos bebedouros havia no tratamento de comedouros individuais para alimentos húmidos (IH)?

Instalações

O ensaio decorreu numa sala com 16,5 m de comprimento, 12 m de largura e 3,7 m de altura média, com 20 parques. Apenas 9 dos parques tinham animais do ensaio, sendo os restantes ocupados por outros animais. A ventilação da sala era estática e feita através de 10 janelas (1,2 m x 1,8 m) em cada uma das fachadas posicionadas a 1,8 m do solo e com apenas rede mosquiteira a através de uma fresta de cumeeira com 0,25 m a todo o comprimento da sala. Cada parque possuía 3,1 m x 2,5 m, totalmente em grelha de betão, pelo que cada animal dispunha de cerca de 0,75 m^2 de área. O volume de ar disponível por animal era aproximadamente de 3,5 m^3. A sala estava equipada com dois depósitos de água de nível constante de 500 l cada, posicionados a cerca de 3,5 m do solo.

Animais

Os porcos utilizados no ensaio eram todos cruzados, fundamentalmente resultantes do cruzamento de porcas (Large White*Landrace) com varrascos (Pietrain*Duroc). Estavam alojados em grupos de 10 animais, 5 machos e 5 fêmeas. O peso médio inicial era de 34,2 kg e o final de 86,6 kg.

Alimentos

A dieta foi oferecida na forma farinada, tendo sido utilizado na moenda um crivo de 4 mm. Os ingredientes que a constituíam estão descritos no Quadro I. O alimento oferecido tinha um valor de matéria seca (MS) de 90,4% e a energia digestível estimada era de 13,90 MJ kg^{-1} MS (Whittemore, 1993), sendo a sua composição química apresentada no Quadro I.

Maneio

Dois dos comedouros (IH e CS) dispunham de reservatório de alimento permitindo uma alimentação *ad libitum*. O alimento no terceiro comedouro (CH) foi distribuído em três refeições diárias iguais. A quantidade foi calculada e ajustada por forma a satisfazer plenamente a capacidade de ingestão de todos os porcos do grupo e não haver, em princípio, restrição alimentar.

Análises químicas

Foram colhidas 8 amostras de alimento ao longo do ensaio. No fim foram misturadas e composta uma amostra global o que foi moído em crivo de 1 mm. Determinaram-se a MS [matéria seca], cinzas PB [proteína bruta] de acordo com os procedimentos propostos por AOAC (1988). O teor NDF [fibra neutro detergente] foi determinado segundo Robertson e Van Soest (1981) e a GB [gordura bruta] segundo Anónimo (1971).

QUADRO I – COMPOSIÇÃO DO ALIMENTO.

Componentes (%)	
Milho	23,55
Mandioca	17,5
Sêmea de trigo	10,35
'Corn gluten feed'	15
Bagaço de soja 44	9,26
Soja integral	15
Farinha de peixe	2,5
Gordura animal	1,8
Carbonato de cálcio	1,41
Fosfato monocálcico	0,51
Sal comum	0,3
Vitaminas e minerais	0,2
Antifúngico	0,05
Antioxidante	0,02
Cloreto de colina	0,05
Talco	2,5
Composição química (%)	
Matéria orgânica (MO)	89,33
Proteína bruta (PB)	20,14
Gordura bruta (GB)	7,23
Fibra neutro detergente (NDF)	19,7

Análise estatística

O animal foi a unidade de medida para o parâmetro ADM [aumento médio diário] e o grupo para os parâmetros ingestão e índice de conversão (IC). Os dados foram analisados por análise de variância com um factor de classificação (efeito do comedouro), utilizando o procedimento MGLH, ANOVA do programa Systat 5.0. A comparação múltipla de médias foi efectuada no mesmo programa recorrendo ao teste de Bonferroni.

4. A alimentação foi limitada nalgum dos grupos de porcos?

Resultados e Discussão

Os resultados obtidos durante o ensaio estão resumidos no Quadro II e na Figura 1.

QUADRO II – RESULTADOS OBTIDOS.

Tratamento	n	Peso inicial	Peso final	AMD	Ingestão	IC
CH	30	34,2	83,2^{a}	0,743^{a}	2,129^{ab}	2,867
IH	29	34,7	92,3^{b}	0,872^{b}	2,361^{b}	2,704
CS	29	33,9	84,4^{a}	0,766^{a}	2,022^{a}	2,636
Efeito		ns	***	***	*	ns
EPM		0,437	1,221	0,015	0,071	0,067

n- nº de animais; CH – comedouro colectivo húmido; IH – comedouro individual húmido; CS – comedouro colectivo seco; AMD – aumento diário médio; IC – índice de conversão; ns – não significativo; * – (P<0,05); *** – (P<0,001); a, b – letras diferentes na mesma coluna indicam diferenças significativas; EPM – erro padrão das médias.

O peso vivo final é diferente (P<0,001) entre o tratamento IH e os tratamentos CH e CS. Entre estes não se verificaram diferenças significativas (Quadro II).

Quando avaliamos o ADM global (Quadro II) verificamos persistir um efeito do tratamento, havendo diferenças entre IH e os outros dois, apresentando aquele crescimentos diários 14 e 17% superiores, respectivamente para CS e CH. Os tratamentos CH e CS não apresentam valores diferentes. Os resultados observados para IH e CS concordam com os encontrados por Walker (1990b) que encontrou diferenças de 105 e por Anderson *et al.* (1990).

Da análise dos ADM entre pesagens (Fig. 1) verifica-se uma evolução positiva destes nos tratamentos IH e CS com destaque para IH, e um decréscimo no tratamento CH. Este decréscimo pode ser resultante de alguma restrição de alimento ocorrida devido ao maneio alimentar, já que para o intervalo de pesos em estudo e para os animais em questão seria de esperar ADM crescentes.

A ingestão de alimento foi diferente ($P<0,05$) entre tratamentos. O tratamento IH apresentou a maior ingestão e difere do tratamento CS. O tratamento CH apresenta um valor que não é significativamente diferente de IH e de CS.

Os resultados encontrado no nosso ensaio sugerem que um único local de alimentação, para um grupo de 10 animais, não condiciona as performances produtivas, o que concorda com Albar e Granier (1989), Walker (1990a), Morrow e Walker (1994), Nielsen *et al.* (1995) e Walker (1995).

5. Quais foram os suínos que ingeriram mais alimentos?

Tal como Walker (1990a) concordamos que a disponibilidade de água no local de alimentação ou aspectos na concepção do comedouro individual húmido favorecem a ingestão. No nosso ensaio a manifestação do efeito do primeiro aspecto referido pode ainda aparecer limitada pelo facto de haver um bebedouro alternativo no parque.

Ao analisar o IC entre os diverso tratamentos observamos que não há entre eles diferenças significativas.

A possibilidade de regulação da quantidade de alimento disponibilizado por cada impulso revelou-se indispensável no início do trabalho, para evitar a acumulação de alimento e consequente desperdício o que concorda com Fortune e Lebas (1991). No decurso do ensaio a quantidade dispensada por cada impulso sofreu um aumento gradual para evitar restrições.

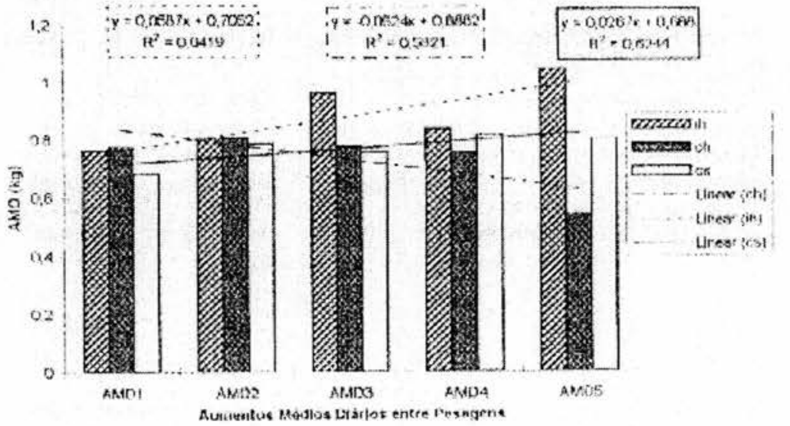

Figura 1. Evolução do aumento médio diário dos animais.

6. Qual foi o resultado obtido pelo facto de haver água disponível no local de alimentação?

7. Qual foi o tratamento que apresentou melhor índice de conversão?

Conclusões

Os dados recolhidos neste ensaio parecem apontar para um efeito favorável do comedouro individual húmido nas performances dos animais em crescimento. Este efeito parece ser mais expressivo na fase final do acabamento.

Os resultados observados no nosso ensaio parecem indicar, no entanto, que as melhores performances conseguidas com o comedouro húmido se devem principalmente a uma maior ingestão de alimento e não tanto a uma melhoria da eficiência na sua utilização.

Os resultados obtidos parecem apontar para um benefício na utilização do comedouro IH. No entanto, dada a diversidade de resultados encontrados pelos diferentes autores e a multiplicidade de modelos deste tipo de comedouro, sugerimos a execução de outros ensaios no sentido de clarificar o assunto.

8. Qual foi o tipo de comedouro que apresentou melhores *performances*?

PRE-TESTS – TEST 2
(1 hora)

Leia o texto que se segue tirado do *Journal of Animal Science*. **À medida que vai lendo** o artigo responda **em português** às perguntas de interpretação referentes a cada secção no espaço em branco a seguir à pergunta.

Este teste será classificado em função:
a) do tempo que demorar a fazê-lo
b) do número de respostas que completar

Este teste tem a duração máxima de 1 hora. Ao iniciar e ao terminar o teste assinale as horas na tabela abaixo de modo a que a duração do teste possa ser contabilizada.

	HORAS
INÍCIO DO TESTE	
FIM DO TESTE	

Gonyou, H.W. and Z. Lou. 2000. Effects of eating space and availability of water in feeders on productivity and eating behavior of grower/finisher pigs. *Journal of Animal Science*. 78.4: 865-870.

Vocabulary:

feeder – container from which pigs eat

grower/finisher pigs – pigs which are being grown/fattened to be slaughtered

h – is a written abbreviation for hour or hours

intake – the amount of a substance taken into an organism (that is eaten by the pig)

lean content – the content (i.e. percentage) of pork (i.e. pig meat) which is not fat

lever – is a handle or a bar that is attached to the feeder which the pig pushes so that feed falls in the trough (i.e. feeding container)

min – is a written abbreviation for minute or minutes

pelleted form – feed form, usually mash, which has been moistened and pressed to form small grains

pen – small enclosure (i.e. space) where a pig or pigs live

wk – is a written abbreviation for week or weeks

Effects of eating space and availability of water in feeders on productivity and eating behavior of grower/finisher pigs

Introduction

Feeders represent the final interface between pigs and the diets designed to meet their nutrient needs. The economic efficiency of a feeder depends on the number of items, including its costs (initial, operating, and depreciation), the number of pigs that can be fed, their ability to attain appropriate feed intakes, and the amount of feed wasted. Feeder comparisons have often been limited to only a few models and have emphasized production differences rather than reasons for those differences (Anderson et al., 1990; Patterson, 1991; Rantanen et al., 1995; Pluske and Williams, 1996). In some cases, differences between two feeders have been attributed to one particular feature of feeder when, in fact several differences in features were confounded. The number of feeder models available in the industry today precludes an independent evaluation of each version for its efficacy. Rather, general features should be identified that can be used by producers when selecting a model, and by manufacturers in the design process. Baxter (1991) has studied specific features of feeders to determine their effect on eating behavior, and Taylor and Curtis (1989) have examined several models in an attempt to identify common features that are beneficial or problematic. The study of eating behavior in both of these studies and in other more recent publications (Walker, 1991; de Haer and Merks, 1992; Morrow and Walker, 1994; Hutson, 1995; Nielsen et al., 1996) is one means of understanding the way in which design features and management affect the performance of a feeder.

The current series of studies was conducted to determine the effects of two design features, number of feeding spaces and availability of water, on the productivity of pigs and to identify behavioral mechanisms by which these features operate.

1. Qual/quais é/são o(s) objectivos das três experiências apresentadas neste artigo?

Materials and Methods

Experiment 1

Facilities, Animals, and Management. The study was conducted in four blocks over time in a fully slatted, environmentally controlled room equipped with 12 spindle (vertical rod)-sided pens, measuring 4.8 x 2.1 m each. Twelve pigs (Pig Improvement Canada), consisting of six females and six castrated males, were randomly assigned within sex to each of the 12 pens at the beginning of each block. The average starting weight of the pigs was 26.8 (SD = 5.28) kg. Pigs were fed a mash diet based on barley and soybean meal in a two-phase feeding program. For the initial 6 wk of the trial, the diet contained 3.26 Mcal DE/kg and 16.8% CP. The second phase diet contained 3.21 Mcal DE/kg and 16.1% CP.

Experimental Treatments. Twelve commercially available models of feeders (for complete description see Gouyou and Lou, 1998) were classified according to the number of feeding spaces provided (single-space, **SS**; multiple-space **MS**) and the availability of water within the feeder (dry, **D**; wet/dry, **WD**). The term 'wet/dry' was used because pigs could control the amount of water mixed with the feed, as opposed to wet feeding systems that premix the feed and water. The experimental feeders represent 10 manufacturers[3] from five countries.

(...)

Experimental Design and Data Collection. The study was conducted in four blocks, with 12 pens per block. Initially the study was designed with complete replication of all models within each block and random allocation to pens. Because some of the models fed two pens, not all models could be included in each block. Each block contained as many models as possible, and each model was used for four pens in the study. Within each block, feeders were randomly allocated to the pens. Pigs were weighed and feed intake was determined at 2-wk intervals. All pigs remained on the trial for 12 wk and were then marketed as individuals reached the target weight of 106 kg, as estimated from the previous weighing. Carcass data were collected on those pigs (n = 308) falling within the targeted weight range of 100 to 110 kg. These data included carcass weight and estimated lean and fat content. Approximately equal numbers of pigs were used for carcass data from each treatment combination.

2. Com que frequência foi determinada a ingestão de alimentos dos porcos?

Table 1. Basic statistical model used to determine treatment differences (Exp. 1)

Item	n	df
Block	4	3
Feeding space	2	1
Water access	2	1
Feeding space x water access	4	1
Model (feeding space x water access)[a]	12	8
Pen (model x feeding space x water access)	48	33

[a] Error term for treatment comparisons.

The feeder area in each pen was videotaped for 24 h on two occasions, during wk 3 to 4 and 8 to 9, when pigs averaged approximately 40 and 80 kg, respectively. The time budget of feeder usage (head in feeder) was determined from instantaneous observations from videotapes at 10-min intervals (Martin and Bateson, 1993). The number of pigs eating from the feeder during each observation was used to determine the total duration of eating, the occupancy rate of the feeder (number of pigs/observation; could exceed 100% if two pigs from one hole), and the average percentage of time each feeder hole was in use (occupied or not, regardless of number of pigs). For behavior variables, the feeder space treatment was modified to include three levels: one, two, and four spaces. For 10 min of each hour, the tapes were observed continuously to determine the number of entrances into the feeder.

Whenever possible, the pen was considered the experimental unit and feeder models were considered the source of replication within treatments. For feeders that fed two pens, feed intake was considered to be proportional to weight gain in each of the pens (feed efficiency was assumed to be identical). This assumption did not affect the mean for each model of feeder, which was the basis of the error term in the statistical analysis. The basic statistical model, presented in Table 1, included block, treatments (space and water access), replication within treatment (feeder models), and replication within feeder models (pens). Treatments were compared using feeder model nested within space and water treatments as the error term. The ADG [average daily gain], ADFI [average daily feed intake], and feed efficiency were summarized for each 4-wk period of the study, as well as for the entire 12-wk trial. Behavioral data were analyzed in a split plot over time, and time of observation (wk 3 to 4 vs 8 to 9) was tested in the sub-plot.

3. De que princípio se parte no caso dos comedouros que alimentam dois parques (isto é, duas pocilgas)?

Experiment 2

The eating speed of pigs was determined for each of the 12 models of feeders used in Exp. 1. Each model was tested using five small (range 41 to 54 kg) and five large (range 85 to 94 kg) pigs, using the same diets employed in the production study. Prior to the series of tests, the pigs had been fed from a dry feeder. The models were tested in a random series. Pigs were familiarized with each model for 24 h prior to the test. After a 6-h period without feed to enhance eating motivation, pigs were individually placed in a pen with the feeder until they had spent 10 min eating (head in feeder). At that time, they were removed, and feed disappearance was determined.

The experimental unit was the individual pig. The model for analysis of variance was similar to that for Exp. 1 (Table 1), with pig substituting for pen. Two of the feeder models required pigs to operate a lever in order to access feed. These models were compared to the others in a separate contrast.

Experiment 3

The eating speed of pigs fed dry or wet feed was determined in a test situation similar to Exp. 2. The dry meal feed was made wet by the addition of an equal weight of water. Previous experience has suggested that eating speed is maximal at this ratio (Gonyou, unpublished data). Ten large (90 kg) pigs were individually tested on each feed form following a 6-h period without feed. The time required to consume 500 g of feed (dry basis) from a feeding bowl was determined. Eating speed was then expressed as grams per minute prior to analysis.

4. Antes do início dos testes que tipo de comedouro foi utilizado?

Results

Of the 576 pigs involved in the production study, 32 (5.5%) were removed due to injury or sickness. Although the number of pigs removed from individual feeder models varied from 0/48 to 6/48, there was no difference in removals from the various feeder categories (SS-D, 6/96; MS-D, 10/192; SS-WD, 8/144; and MS-WD, 8/144). Production results from Exp.1 are summarized in Table 2. No significant differences were observed between single- and multi-space feeders in any of the production variables. The availability of water within the feeder resulted in an increase in ADFI of approximately 6% and ADG of 5% over the entire trial ($P < .05$). A numerical trend for increased intake and gain with wet/dry feeders existed during each 4-wk period, with the greatest differences occurring during the latter 4-wk periods. Because both intake and gain increased proportionally with wet/dry feeders, no differences in efficiency were observed. Pigs fed from dry feeders were leaner (Table 2) than those fed from wet/dry feeders ($P < .05$).

Table 2. Effects of number of feeding spaces and availability of water within the feeder on production traits (mean ± SEM) of growing/finishing pigs (Exp. 1)

	Feeding space		Availability of water	
Item	Single	Multiple	Dry	Wet/dry
No. of feeder models	5	7	6	6
ADG, g/d				
wk 1-4	798 ± 6.7	783 ± 5.7	788 ± 6.2	791± 6.2
wk 5-8	919 ± 13.9	965 ± 11.8	920 ± 12.8	964 ± 12.8
wk 9-12	936 ± 13.5	970 ± 11.4	921 ±12.3*	986 ± 12.3
wk 1-12	885 ± 8.7	905 ± 7.3	873± 17.9*	917 ± 7.9
ADFI, kg/d				
wk 1-4	2.03 ± .011	1.98 ± .013	1.98 ±.012*	2.03 ± .012
wk 5-8	2.78 ± .036	2.92 ± .031	2.76 ± .034	2.94 ± .032
wk 9-12	3.34 ± .055	3.39 ± .046	3.28 ± .050#	3.46 ± .050
wk 1-12	2.69 ± .020	2.77 ± .017	2.66 ±.018*	2.82 ± .018
Efficiency, gain/intake				
wk 1-4	.405 ± .0052	.391 ± .0045	.401 ± .0048	.392 ± .0048
wk 5-8	.332 ± .0065	.335 ± .0055	.334 ± .0061	.334 ± .0058
wk 9-12	.280 ± .0040	.288 ± .0034	.281 ± .0037	.287 ± .0037
wk 1-12	.329 ± .0020	.325 ± .0017	.329 ± .0019	.326 ± .0018
Carcass % lean	56.5 ± .24	56.8 ± .20	57.0 ± .24	56.3 ± .21*

#$P < .10$; *$P < .05$; comparisons were made between single and multiple, and between dry and wet/dry on the same row.

Significant differences were observed in all aspects of eating behavior between small and large pigs in Exp. 1 (Table 3). Small pigs spent approximately 20% more time eating and entered the feeder 30% more often than did large pigs ($P < .01$ and $< .05$, respectively). Consequently, the occupancy rates of the feeder and individual holes were approximately 20% higher for small pigs ($P < .01$ for both). Provision of water within the feeder also affected all aspects of eating behavior, reducing total duration of eating by 17% ($P < .01$), frequency of feeder entrances by 39% ($P < .01$), and occupancy rate of feeders by 13% ($P < .05$). However, because two dry feeders provided four feeding holes, occupancy rate per hole was reduced with dry feeders ($P < .05$). Increasing the number of feeding holes resulted in an increase in total duration of eating and a reduction in the occupancy rates for both the feeder and individual feeding holes ($P < .05$) but did not affect frequency of entrances into the feeders (Table 4).

Eating speed in the short-term tests (Exp. 2) averaged 44.6 ± 1.2 g/min and was not affected by the number of feeding spaces or availability of water. Overall, large pigs ate faster than small pigs (43.5 ± 1.2 vs 35.6 ± 1.2 g/min; $P < .01$), but this was only true for feeders not operated by levers (Table 5). When water was premixed with feed in Exp. 3, eating speed increased from 42.2 ± 7.3 to 123.7 ± 30.5 g/min ($P < .01$).

Table 3. Effects of size of pig and availability of water on eating behavior (mean ± SEM) of growing/finishing pigs (Exp. 1)

	Size of pig		Availability of water	
Item	40 kg	80 kg	Dry	Wet/dry
No. of feeder models	12	12	6	6
Total duration of eating, min/d	102.0±4.68**	85.6 ± 3.46	104.1 ±4.50**	86.3 ± 4.50
Frequency of entrances, no./d	55.6 ± 2.67*	42.2 ± 2.67	60.1 ± 3.25**	36.7 ± 3.25
Occupancy rate of feeder, % of time	64.3 ± 1.91**	54.1 ± 1.39	63.5 ± 1.91**	55.1 ± 1.39
Occupancy rate of feeder holes, % of time	53.3 ± 1.96**	43.1± 1.45	44.9 ± 2.11*	49.5 ± 2.11

*$P < .05$; **$P < .01$; comparisons were made between 40 and 80, and between dry and wet/dry on the same row.

Table 4. Effects of number of feeding spaces on eating behavior (ls mean ± SEM) of growing/finishing pigs (Exp. 1)

	Feeding spaces		
Item	One	Two	Four
No. of feeder models	5	4	3
Total duration of eating, min/d	84.0 ± 4.33^{a}	97.6 ± 4.17^{b}	11.5 ± 6.49^{c}
Frequency of entrances, no./d	45.2 ± 3.69	40.8 ± 3.58	52.4 ± 4.20
Occupancy rate of feeder, % of time	71.5 ± 2.15^{b}	50.3 ± 1.96^{a}	56.9 ± 2.86^{a}
Occupancy rate of feeder holes, % of time	68.1 ± 2.21^{c}	38.7 ± 2.13^{b}	21.5 ± 3.31^{a}

^{a,b,c}Within a row, means lacking a common superscript letter differ ($P < .05$).

Table 5. Effect of the size of pig and type of feed access on eating speed (g/min; mean ± SEM) of growing/finishing pigs (Exp. 1)

	Feeding access	
Pig size	Lever (n = 2)	Non-lever (n = 10)
Small (48kg)	34.4 ± 2.8	35.9 ± 0.9
Large (90 kg)	33.8 ± 4.6*	44.6 ± 1.4

*$P < .05$ for lever vs non-lever.

5. Quais os suínos que registaram uma maior taxa de ocupação nos comedouros com lugares de alimentação individuais?

Discussion

This study addresses the question of whether two specific features of feeders, water access and number of feed spaces, affect the behavior and productivity of pigs. In the case of water access in particular, and to a lesser degree number of feed spaces, incorporation of this feature necessitates a number of design changes that confound the evaluation. The simplest comparison of the same model of feeder operated as dry and wet/dry is generally inappropriate. Most feeders designed to be used dry would become plugged if water access were added. Similarly, changes in means of accessing feed in wet/dry designs to prevent plugging may bias the results if the feeder were used for dry feed. The approach taken in this study has been to examine a range of dry and wet/dry feeders and to consider the confounding involved in their various designs to contribute to experimental error in this study, in which models were the unit of replication. Even though these sources of variation were included in the experimental error, treatment differences were found. A treatment difference does not imply that a replicate (feeder model) from one treatment cannot exceed the performance of a replicate from a statistically superior treatment. Rather, statistical differences imply that most comparisons of replicates (feeder models) would follow the identified trend and that reversals are uncommon exceptions. Treatment differences observed in this study imply that the features of water access and number of feeding spaces have general application to feeder design and that exceptions to these findings may exist but would be uncommon.

It should be noted that the feed used in this series of experiments was in meal form, rather than pelleted form. Meal diets reduce the eating speed of pigs (Gonyou, unpublished data) and in these studies would have the effect of increasing total duration of eating. The use of meal rather than pelleted diets is likely to reduce the number of pigs that can be fed from a feeding space.

The number of pigs that can be accommodated per feeder space affects the relative feeder cost per pig and the number of pigs per pen. Therefore, it is an important consideration of producers when designing new facilities or replacing equipment. Traditional recommendations have suggested fewer than 10 pigs, perhaps as few as four, per feeder space (English et al., 1988), but recent results have indicated that as many as 20 or 30 pigs can be fed from a single-space feeder and still maintain production (Walker, 1991; Nielsen et al., 1995). In the current study, it was clear that 12 pigs could be fed from a single-space feeder without affecting intake, growth rate, efficiency, or carcass characteristics, compared to providing a second feeding space for the same number of pigs. However, the limiting factor in determining the number of pigs that can eat from a feeding space is the total duration of eating, which is dependent on intake and eating speed. When 12 pigs were fed from a single-space feeder, compared to a multiple-space feeder, they were only able to maintain intake by increasing eating speed. Morrow and Walker (1994) reported a similar decrease in total duration of eating for single vs two-spaced feeders, as well as an increase in queuing time at the feeder. When the effects of feeder space (single), pig size (small), and lack of within-feeder water access (dry) on occupancy rate were combined within this study, occupancy rates reached a level of approximately 80%. Based on these results, only a small increase in group size would be possible before feeder space would limit productivity. Walker (1991) reported that productivity was maintained at occupancy rates of 80 to 90% in his study using a single-space wet/dry feeder.

6. Segundo o presente estudo, poderia o número de suínos ser grandemente aumentado continuando a manter a mesma produtividade sem aumentar o número de espaços no comedouro?

Several previous studies have indicated that the availability of water within the feeder increases intake and rate of gain (Anderson et al., 1990; Walker, 1990; Payne, 1991). However, most of those studies involved only a few models of dry or wet/dry feeders. In the current study, the provision of water in six of the feeder models resulted in consistent increases in ADG and ADFI, supporting the hypothesis that previous results were due to the wet/dry feature rather than to other unique features of individual feeders. The reduction in carcass lean for pigs fed from wet/dry feeders supports previous observations (Walker, 1990; Payne, 1991) and suggests that diet formulation should be modified for wet/dry feeders, taking into account the increased intake. The discrepancy in the effect of water availability on eating speed between Exp. 1 and 2 may be due to the methodology. In Exp. 2 the pigs were deprived of feed prior to a short test. Few pigs accessed water during the 10-min test period. Provision of premixed fed and water in Exp. 3 clearly indicated that eating speed could be increased with wet feed. The increase in eating speed on wet/dry feeders in the production study may have contributed to the increased intake, but if so it was not due to increased access to feeder space because this was not limiting for the multi-space feeders. The effects of wet/dry feeding on gain and intake may be more dramatic with mash than with pelleted feed, because eating speed for pelleted diets is high regardless of added water (H. Gonyou, unpublished results).

Eating behavior was affected by the size of the pig. Previous studies have indicated that, as pigs grow, the total duration of eating (Walker, 1991; Hyun et al., 1997) and number of meals (Walker, 1991) decrease. The reduction in total duration was confirmed in this study, and, although we measured entrances rather than meals, the number also decreased with age. With the exception of the interaction with feed access type (lever vs non-lever) on eating speed, no significant interactions between pig size and feeder type were found. It may be that the amount of feed accessed per lever activation was inadequate to achieve a higher eating rate among large pigs. The effect of greater duration of eating for small pigs is to increase the occupancy rate for feeder spaces. It is likely that the maximum number of pigs that can be fed per feeder space is less for smaller pigs than for large. That is, for feeders with well-divided feeding spaces, fewer pigs can be accommodated during the growing period than the finishing period. Walker (1991), feeding 30 pigs from a single-space feeder, reported a decrease in intake relative to smaller group sizes only during the growing phase. However, if the feeder has an undivided feeding trough, the number of effective feeding spaces will change as the pigs grow and crowding may not occur.

7. O que é que o tamanho dos suínos afectou?

Implications

Providing a water source within a feeder is beneficial. For pigs eating mash diets, average daily feed intake and gain increased by approximately 5%, but carcass lean was slightly reduced, when water access was provided within the feeder. Diets for use in wet/dry feeders should be formulated to account for the increased intake and gain to address carcass quality. At least 12 pigs could be fed from one of our single-space dry feeders without negatively affecting intake and gain. Total duration of eating was reduced when water was available in the feeder, and for older pigs. Thus, the number of pigs fed from a feeding space would be greater for wet/dry feeders and for larger pigs. Productivity can be maintained at feeding space occupancy rates of 80%, but extrapolation of data among conditions will be limited due to the ability of pigs to adapt their eating behavior when crowding occurs.

8. Em que condições houve um decréscimo na duração total da ingestão de alimentos?

PRE-TESTS – TEST 3
(1 hora)

Leia o texto que se segue tirado de *Tests of Agrochemicals and Cultivars*. Escreva o **resumo** do artigo **em português** nos espaços em branco do Quadro 1 depois do artigo. O quadro serve para não se esquecer de nenhuma secção do texto. Em cada espaço pode escrever uma ou mais frases. No entanto, não se esqueça que um resumo deverá ser tão breve quanto possível.

Este teste tem a duração máxima de 1 hora. Ao iniciar e ao terminar o teste assinale as horas na tabela abaixo de modo a que a duração do teste possa ser contabilizada.

	HORAS
INÍCIO DO TESTE	
FIM DO TESTE	

Tests of Agrochemicals and Cultivars. 20 (1999)
Annals of Applied Biology. 134 (Supplement)

Sensitivity of *Agaricus bisporus* to fungicide *in vitro*

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Key words: Fungicides, *Agaricus bisporus*, mushroom

Introduction

When cultivated the commercial mushroom (*Agaricus bisporus*) is prone to a number of infectious diseases which can lead to serious reductions in yields and quality, with heavy economic losses. Fungal diseases and weed moulds can infect the compost, casing or the fruit bodies of mushrooms. Few fungicides are currently recommended for use in mushroom production. The aim of this study was to investigate the effects of a range of selected fungicides on the mycelial growth of *A. bisporus*, on agar, to indicate their potential role for disease and mould limitation when applied in the presence of *Agaricus*.

Materials and methods

Two commercial strains of *A. bisporus*, A and B, were selected. Sub-cultures of these strains were grown at 25°C on malt extract agar (MEA) for two wk [weeks] before their transfer to fungicide amended media. Seven fungicidal materials: benomyl (Benlate, 50% w.p., Dupont), carbendazim (Derosal, 50% w.p., BASF), thiabendazole (Storite, 45% e.c., MSD Agvet), prochloraz+Mn (Sporgon, 50% w.p., Darmycel), chlorothalonil (Bravo 500, 50% e.c., BASF), formaldehyde (Formalin, 40% s.l. BH&B) and zineb (Zineb, 80% w.p., Avon) were suspended or dissolved in sterilised distilled water and added to autoclaved MEA after cooling to 55°C, at doses of 0.0, 0.5, 5.0 and 250.0 mg a.i. litre^{-1}. Twenty ml of each amended medium, in addition to the control, were dispensed into single-vent sterilised, 9 cm diameter petri dishes. Each treatment was replicated three times. The petri dishes were inoculated at the centre with 5 mm diameter mycelial discs removed from the edges of 14 day old cultures. The inocula were placed with the fungal mycelium in contact with the agar surface. Two diameters of the colonies, at right angles, were measured after 2 wk incubation in the dark at 25°C. The mean values of horizontal and vertical diameters were recorded. Data were subject to statistical analysis using Duncan's multiple range test.

Results

The two strains of *A. bisporus* were adversely affected by all the fungicidal materials tested (Table 1). Only benomyl at 0.5 litre^{-1} used on strain A failed to significantly reduce mycelial diameter. Zineb totally inhibited the growth of *A. bisporus* at all dose rates tested, while benomyl and prochloraz+Mn gave total inhibition at 50 mg litre^{-1} and above. In contrast, carbendazim, thiabendazole and chlorothalonil performed similarly by significantly reducing the growth of *A. bisporus*, but not totally inhibiting it, even at the highest dose of 250 mg litre^{-1}. Formaldehyde inhibited the growth only at the highest dose tested of 250 mg litre^{-1}. Comparing the three benzimidazole fungicides, benomyl was less inhibitory than carbendazim or thiabendazole at the two lower dose rates, but, in contrast, totally inhibited growth of both *A. bisporus* strains at and above 50 mg litre^{-1}.

Discussion

The two mushroom strains under study did not significantly vary in their tolerance to the seven fungicides tested. In a previous study (1), significant differences in tolerance to fungicide on the basis of mushroom weights harvested, were recorded between different strains of *A. bisporus*.

Examination of growth inhibition of the two *Agaricus* strains A and B, shows that there were no significant differences in the ranking order of sensitivity to fungicides. Despite the lack of variation between strains, some trends as regards fungicides were observed. Zineb demonstrated a severe effect on both strains precluding its use with *A. bisporus*, even if control of fungal pathogens or weed moulds is identified. In contrast, benzimidazole group fungicides (benomyl, carbendazim, thiabendazole), chlorothalonil, formaldehyde and prochloraz+Mn all seemed acceptable in terms of mycelial effects from the point of view of *A. bisporus* sensitivity, although all will be undesirable at high dose rates.

Table 1. Effect of seven fungicides on mycelial growth of *A. bisporus*

Fungicide	Dose (mg litre^{-1})	Colony diameter increase (mm)	
		Strain A	Strain B
Control	0.0	44.0a*	45.3a
Benomyl	0.5	47.0a	34.0b
	5.0	35.3b	25.5d
	50.0	ng**	ng
	250.0	ng	ng
Carbendazim	0.5	27.0de	32.1bc
	5.0	29.7cd	36.1b
	50.0	15.0g	14.3efg
	250.0	8.1i	7.5h
Thiabendazole	0.5	24.5f	16.0e
	5.0	23.0f	14.8ef
	50.0	15.1g	12.3efgh
	250.0	10.3hi	9.5gh
Chlorothalonil	0.5	13.1gh	24.0d
	5.0	11.8hi	10.1fgh
	50.0	10.7hi	9.3gh
	250.0	8.0i	7.7h
Formaldehyde	0.5	30.5c	26.5d
	5.0	24.8ef	24.0d
	50.0	9.5I	11.0efgh
	250.0	ng	ng
Prochloraz+Mn	0.5	22.5f	28.8cd
	5.0	8.1i	15.3ef
	50.0	ng	ng
	250.0	ng	ng
Zineb	0.5	ng	ng
	5.0	ng	ng
	50.0	ng	ng
	250.0	ng	ng

(*) Means in each column followed by the same letters are not significantly different (P=0.05), (**) ng= no growth

References

1. Gandy D G. 1981. *Mushroom Science*, **XI(2)**: 473-484.

Vocabulary

agar – culture, medium, the gelatine in which bacteria or tissue can be grown

autoclaved – sterilised with wet heat

benzimidazole fungicides – chemical family of fungicides which includes benomyl, thiabendazole, and carbendazim

e.c. – emulsifiable concentrate

mycelium – mass of threads which forms the main part of a fungus

mycelial – adjective from mycelium

strain –distinct variety of species, which will breed true, usually referring cultivated plants e.g. 'they have developed a new strain of virus- resistant rice.'

w.p. – wettable powder

Clancy, J.K. and S.O. Abosriwil. 1999. Sensitivity of *Agaricus bisporus* to fungicide *in vitro*. *Tests of Agrochemicals and Cultivars*. 20. *Annals of Applied Biology*. 134 (Supplement): 32-33.

Quadro 1

Introdução	1	
Objectivo(s)	2	
Material e Métodos	3	
Resultados	4	
Discussão	5	

1. Read the text below. What type of publication do you think this text is taken from? Write this in the box provided. You can answer either in English or in Portuguese.

Type of publication

The area of winter peas grown in the UK increased until 1995 and has remained static since, with an estimated 3500 ha sown in 1997. Current winter varieties have the potential to give higher yields (1) and are earlier to harvest, than conventional spring sown types. The rate of expansion in the use of winter varieties has slowed due in part to limited agronomic data and the potential risks of pea bacterial blight. An experiment was established in autumn 1996 to investigate the influence of winter sowing dates on yield of three winter cultivars of combining peas.

Three winter combining peas, cvs Rafale, Blizzard (Wherry & Sons, Bourne, Lincs), and Victor (Harlow Agricultural Merchants, Bishops Storford, Herts) were sown at 100 seeds m^2, in a light peat-loamy soil (34% organic matter) Prickwillow soil series, at Mepal, Cambridgeshire at two sowing dates (7 November and 5 December 1996). The previous crop was winter wheat. [...] Senescence was assessed [...]. *Mycosphaerella pinodes* was assessed [...]. Bacterial blight was assessed [...]. The crop was desiccated on 19 July and assessed for yield by combining an area 2.3 m x 16 m, from each plot, on July 1997 when seed moisture was between 13.1% and 15.0%. Seed moisture was assessed [...].

Prolonged frosty weather during winter 1996-97, with continuous grounds frosts from 21 December 1996 to 12 January 1997, delayed emergence with both sowing dates remaining at GS 1,02 for many weeks. [...] Yields were greater for the later sowing date (4.97 ha^{-1}). Cultivars Victor and Blizzard had significantly higher yields than Rafale at both sowing dates. Disease levels were higher on cv. Rafale with *Mycospharella pinodes* significantly greater than in the other two varieties which may account for the lower yields from Rafale. [...] There were no significant differences in pea bacterial blight levels between varieties or between sow dates [...] Lodging was present in all varieties but the lodging was significantly greater in cv. Blizzard compared to Victor. Sow date had no effect on lodging or on senescence. Higher levels of senescence occurred on cv. Rafale compared to other varieties.

This trial demonstrates that the three varieties tested are all tolerant of frosty winter conditions and show some levels of resistance to pea blight. [...] The results show high yields (in excess of 5.2 ha^{-1}) can be achieved by sowing appropriate varieties in early December and these compare favourably to spring drilling yields. This data supports the authors previous study (1) that early December is the optimum timing for drilling winter peas on light peaty soils.

2. Read the sentences below. Label (see labels below) them according to what they do in the text. The first one is done for you.

A. refers to an earlier section of the text (e.g. chapter or paragraph) by restating or summarising what was written before;

B. refers explicitly to what the writer(s) says/say they are going to do next in the text (e.g. to illustrate this point let us consider...; the explanation is…).

C. refers to a later section of the text (e.g. chapter or paragraph), that is the text is being anticipated;

D. none of the above

2.1	Figure 16.3 compares the results for those who were 'very worried' about specific environmental issues.	B
2.2	This chapter provides an outline of the main uses and changes and the way changes are controlled, and it also deals with built heritage. There are four main sections […]	
2.3	(text in chapter 10) Changes in agricultural land use have caused significant changes in Britain's rural landscape (see also Chapter 5 on land use and land cover).	
2.4	Box 13.2 explains the measurement of radioactivity and dose.	
2.5	Many such surveys have been undertaken, particularly on birds and mammals. The following section covers a few examples of widespread species.	
2.6	Wildlife, like air, land and soil, is an important natural resource. Changes in wild life populations also act as indicators of other environmental changes.	
2.7	Results from the Scottish survey indicate that the majority of people look to central government to resolve, and pay for, many environmental problems.	
2.8	An important step in identifying the effects on soil quality of a potential contaminant is an understanding of the complex interactions that occur within the soil. This is considered further with respect to certain pollutants later in this chapter.	

(Brown, A. (ed.) 1992. *The UK environment*. Department of the Environment, HMSO: London: 50, 51, 138, 139, 181, 226, 228.)

3. Read the texts below. Fill in each gap with an appropriate word chosen from the 4 alternatives given, as the example below demonstrates.

> Example:
>
> The plants in most tropical rain forests have never been inventoried, yet the few that remain are rapidly being cleared. Many species that inhabit these areas may be lost for ever. **For example**, a wet forest strip of coastal Ecuador was almost completely denuded of forest in the 1960s.
>
> a) Thus b) For example c) Hence d) But
>
> (Jones, S.B. and A.E. Luchsinger. 1987. *Plant systematics*. 2nd edn. New York: McGraw-Hill: 6.)

3.1 Sufficient, safe nutritious food is an essential ingredient for good health. ________ much progress, an enormous number of people are hungry and malnourished.

a) Despite b) Since c) Therefore d) Furthermore

(Tansey, G. and T. Worsley. 1995. *The food system: a guide*. London: Earthscan Publications: 49.)

3.2 Plant cell walls consist mainly of cellulose and other complex sugars. ________ plants have no skeleton, the rigidity provided by the wall is important in providing support and protection to the plant and in enabling it to grow upright and to reach a considerable height.

a) Still b) Then c) Because d) Similarly

(Chesworth, J.M., T. Stuchbury and J.R. Scaife. 1998. *An introduction to agricultural biochemistry*. Chapman and Hall: 6.)

3.3 The Codes require that all scientific names are either Latin or treated as Latin, written in Latin alphabet and subject to the rules of Latin grammar. ________, you must be very precise in your use of such names.

a) Nevertheless b) Although c) Consequently d) Conversely

(Jones, A., R. Duck, R. Reed and J. Weyers. 2000. *Practical skills in environmental science*. Harlow: Prentice Hall: 112.)

3.4 The scientific name of a plant communicates the species and genus, and from that the family may be easily determined. ________, one can assume that there are other individual plants that share certain of the same features.

a) In addition b) As a result c) To sum up d) On the contrary

(Jones, S.B. and A.E. Luchsinger. 1987. *Plant systematics*. 2nd edn. New York: McGraw-Hill: 4.)

4. Read the texts below and select the correct word from the two alternatives given, as the example below demonstrates. Answer in the box provided.

Example: The simplest experiments are those in which one treatment (factor) is applied at a time to the subjects. **This analysis /This approach** is likely to give clear-cut answers but, it could be criticized for lack of realism. (Jones, A., R. Duck, R. Reed and J. Weyers. 2000. *Practical skills in environmental science*. Harlow: Prentice Hall: 60.) Answer: **This approach**

4.1	
4.2	
4.3	
4.4	

4.1 Although solar ration travels in a straight line, the gases and dust particles in the atmosphere can redirect this energy. **This process, / This scenario**, called *scattering*, explains how light reaches into a shaded area or a room when direct sunlight is absent.

(Lutgens, F.K. and E.J. Tarbuck. 1998. *The atmosphere*. 7th edn. London: Prentice-Hall International, Inc.: 36.)

4.2 Your equipment or facilities may affect [experimental] design because you cannot regulate conditions as well as you might desire. For example, you may be unable to ensure that temperature and lightening are equal within the experimental area or you may have to accept a great deal of initial variability if your material is collected from the wild. **This reason / This problem** is especially acute for experiments carried out in the field.

(Jones, A., R. Duck, R. Reed and J. Weyers. 2000. *Practical skills in environmental science*. Harlow: Prentice Hall: 57.)

4.3 Organ culture means the maintenance of whole organs or fragments of tissue with the retention of a balanced relationship between the associated cell types, as exists *in vivo*. **This idea / This abstraction** of the maintenance of tissue was important in the early development of culture techniques.

(Butler, M. 1996. *Animal cell culture and technology: the basics*. Oxford: IRL Press: 1.)

4.4 [In poultry 'factories'] 100,000 birds can be kept indoors in cages with movement restricted and feed, water and prophylatic drugs delivered to them. Similar developments have occurred with pigs and calves. **<u>These trends / These positions</u>** have been aimed in part at reducing risks that farmers face from natural fluctuations in their environment caused by weather, climate, disease, etc.

(Tansey, G. and T. Worsley. 1995. *The food system: a guide*. London: Earthscan Publications: 97.)

5. Read the expressions below and tick (✓) the expression which means the same as the given phrase, as the example below demonstrates. Answer in the box provided.

Example:		
water quality standards	the standards for the quality of water	☑
	the quality of the standards for water	☐

5.1	soil erosion control practices	a) practices which control the erosion of the soil	☐
		b) practices which are controlled by the erosion of the soil	☐
5.2	soil and water environment	a) water environment and soil	☐
		b) water environment and soil environment	☐
5.3	disease control purposes	a) the purposes of controlling diseases	☐
		b) the diseases controlling the purposes	☐
5.4	environmental impact assessment	a) the impact of the assessment on the environment	☐
		b) the assessment of the impact on the environment	☐
5.5	stratospheric ozone layer	a) the layer of ozone in the stratosphere	☐
		b) the ozone in the stratosphere layer	☐

(Brown, A. (ed.) 1992. *The UK environment*. Department of the Environment, HMSO: London: 27, 49, 55, 119.)

6. Read the definitions below. Match each definition with a word/words from the box. The first one is done for you.

abstraction	acid deposition	evapotranspiration	leaching	oxidation

6.1	Removal of water from surface waters (lakes, reservoirs, rivers) and groundwater (rocks) for domestic, commercial and industrial use.	**abstraction**
6.2	Loss of soluble substances from a solid mass, e.g. soil, by the action of percolating liquid.	
6.3	Usually a chemical reaction with oxygen, producing oxides.	
6.4	The removal from the atmosphere by trees, plants and the earth's surface of sulphur and nitrogen containing compounds.	
6.5	Loss of water resulting from transpiration from plants (loss of water vapour from plants through stomata) and evaporation from surface water and soil.	

(Brown, A. (ed.) 1992. *The UK environment*. Department of the Environment, HMSO: London: 243-246.)

7. Read the introduction of a research article and answer the two questions below.

Introduction

In 1992, the Toronto city government was considering whether to allow miniature pigs as domestic pets within the city boundaries. The week before the final vote was a busy one for pig biologists. Proponents of pet pigs wanted expert testimony that pigs are highly intelligent and make engaging companion animals. Opponents were seeking scientific data on the size and strength of pigs and their ability to damage dwellings and public property. City officials wanted to know whether pigs carry diseases that could be transmitted to humans or other domestic animals. The three groups, although addressing the same issue, saw very different criteria as relevant to the decision. .../...

(cont.)

The Toronto pig debate was one small example of the ongoing confusion over the use of non-traditional species as companion animals[1]. In many cases, the concerns have been expressed simply as a call to avoid 'exotic' or 'wild' species[2] for purposes of companionship. Some municipalities have enacted regulations concerning the keeping of exotic animals, and many animal welfare organizations have policies discouraging trade in wild and exotic species (eg British Columbia Society for the Prevention of Cruelty to Animals [1982]; American Veterinary Medical Association [1990]; Metropolitan Toronto Zoo [1994]; American Humane Association [1995]; The Humane Society of the United States, see Farianto & Lamb [1995]; Canadian Federation of Humane Societies [1997]; Royal Society for the Prevention of Cruelty to Animals [1997]; People for Ethitcal Treatment of Animals [1998]; Zoocheck Canada [1998]).

Unfortunately, these policies and regulations often give rise to conflicting interpretations. Confusion arises partly because the term 'exotic', which most correctly refers to animals that are not native to the local area, has sometimes been used to mean merely non-traditional or faddish companion animals. In fact, none of these meanings is necessarily related to the ethical issues that arise over keeping companion animals. For example, gerbils, *Meriones* spp., which appear to be satisfactory pets for young children, are a North African and Central Asian species which have been captive –bred only since the 1960s (Huddart & Naherniak 1995), and hence would be considered exotic by some definitions. Furthermore, even among species that are commonly kept as companion animals, some appear to be much more suitable than others, as evidenced by the numbers given up to animal shelters or for euthanasia. Hence, simply designating species as exotic or non-exotic does not satisfactorily distinguish suitable from unsuitable companion animals. In addition, suitability is also influenced by the owner's awareness and ability to care for the animal. Therefore, a more systematic analysis is needed to evaluate the suitability of different species as companion animals, based on the wide range of issues relevant to this assessment.

The purpose of this paper is to identify the various issues that affect the suitability of different species as companion animals, and to bring these issues together in the form of a systematic assessment framework which could be used in creating policy or regulations, and for educational purposes.

7.1 Choose the most appropriate title for the article. Tick (✓) one box.

Are wild and exotic species suitable companion animals?	
Animal welfare position on wild and exotic animals as domestic pets	
Assessing the effects of policy and regulations applied to non-traditional species as domestic pets	
A framework for assessing the suitability of different species as companion animals	
The Toronto pig debate as a framework for analysing the suitability of different species as pets	

7.2 Underline the sentence or sentences which helped you to choose the title.

8. Look at the pairs of sentences and tick (✓) one in which the author is less committed to what he or she is saying, as the example below demonstrates. Answer in the box provided.

Example:	
Henderson (2000) suggested that milk quality was an influential factor.	☑
Miller (1999) showed that the use of fungicide X inhibited mushroom growth.	☐

8.1	Johnson (2000) concluded that rabbits in group A were the most resistant to adverse climatic conditions.	☐
	Buttel *et al.* (1999) seem to believe that environmental attitudes of farmers vary greatly.	☐
8.2	Lewis (2000) found that seed yield increased under controlled conditions.	☐
	An alternative approach to farm productivity was proposed by Harris and Williams (2000).	☐
8.3	Rogers and Walsh (1999) hypothesise an inverse relationship between debt level and the adoption of conservation practices.	☐
	Smith (2000) demonstrated that high incubation temperature affected hatchability of duck eggs.	☐
8.4	Evidence presented by several authors (Brown et al. 1998; Baker 1999; Phillips 2000) confirmed the results obtained by Johnson (1958).	☐
	Stone (1999) postulated a new approach to prevent the disease.	☐

9. Read the paragraphs below. In each paragraph one sentence has been deleted. Match the correct sentence (a - d) with each paragraph (1 - 4). The first one is done for you.

1	2	3	4
c			

a)	Basically, a food is a part of the environment that we eat.
b)	Human beings value food for far more than its nutrient content.
c)	As individuals, we need sufficient, safe, nutritious food for a healthy life.
d)	Nutrients, however, are the biochemical compounds found in foods which sustain our bodies' biological processes.

Paragraph 1

____. But what do we eat and why? Obviously, that depends partly upon external factors such as our economic status, but there are also deeper internal forces at play. In this chapter, we consider the basic psychological, social and cultural needs of individuals that food meets. Understanding our individual relationships to food, like our species' relationship with the biosphere, is important in developing an overall picture of the food system and how the different actors in the system use the needs of individuals to promote their specific interests and economic benefits.

Paragraph 2

____. Unlike nutrients, human foods are defined culturally. In most cultures, people only ingest a small number of the available, potentially nourishing substances. Much human socialization relates to the development of forms of disgust towards objects which could provide some nourishment – for example cockroaches and other insects.

Paragraph 3

____. Macronutrients, which we need in large amounts, are the proteins, carbohydrates and fats; micronutrients, which we need in much smaller amounts, include vitamins and minerals. In addition, foods contain many hundreds of non-nutrient compounds which may be important for the body's biochemical processes.

Paragraph 4

____. For example, expensive, difficult to prepare foods may be served to show guests how much they are valued by their host; busy executives may invite employees to breakfast to save time; lovers may share special meals together in 'special' restaurants. We use these properties of foods to meet our psychological and social needs – for example to express love and self interest.

10. Read the sentences below. Rank the sentences on the following scale: 1 = <u>the most certain / committed to</u> 5 = <u>the least certain</u>.

SENTENCES	RANKING
Three of the hypotheses were supported by the data.	
Three of the hypotheses seemed to be supported by the data.	
Three of the hypotheses were firmly supported by the data.	
Three of the hypotheses were partly supported by the data.	
Three of the hypotheses appeared to be partly supported by the data.	

11. Read the paragraphs below. Choose a correct heading for each one from the box below. The first one is done for you.

Content	Conclusions	Introduction	Material and Methods	Results

Paragraph 1: ________Content________

The typical format [of a poster session] is that of a scientific report (see Box 48.1), i.e. with the same headings, but with a considerably reduced content. Never be tempted to spend the minimum amount of time converting a piece of scientific writing into poster format. At scientific meetings, the least interesting posters are those where the author simply displays pages from a written communication (e.g. journal article) on the poster board! Keep references within the text to a minimum – interested parties can always ask you for further information.

Paragraph 2: ________________________

This should give the reader background information on the broad field of study and the aims of your own work. It is vital that this session is as interesting as possible, to capture the interest of your audience. It is often worth listing your objectives as a series of numbered points.

Paragraph 3: ________________________

Keep this short, and describe only the principal techniques used. You might mention any special techniques, or problems of general interest.

Paragraph 4: ________________________

Don't present your raw data: use data reduction wherever possible, i.e. figures and simple statistical comparisons. Graphs, diagrams, histograms and pie charts give clear visual images of trends and relationships and should be used in place of tabulated data (see p. 194). Final copies of all figures should be produced so that the numbers can be read from a distance of 1 m. Each should have a concise title and legend, so that it is self-contained [...]. Avoid using graphs straight from a written version, e.g. a project report, textbook, or a paper, without considering whether they need modification to meet your requirements.

Paragraph 5: ________________________

This is where many readers will begin, and they may go no further unless you make this section sufficiently interesting. This section needs to be the strongest part of your poster. Refer to your figures here to draw the reader into the main part of your poster. A slightly larger and bolder typeface may add emphasis, though too many typefaces can look messy.

12. In the sentences below some words are highlighted. Replace them with others words, making sure the meaning remains the same, as the example below demonstrates. Answer in the box provided.

Example: Carbon can easily and stably exist as a neutral atom with six electrons, or it can form covalent bonds by sharing the valence electrons (usually four) of other atoms. **For instance**, in methane (CH_4) one carbon atom shares one electron with each of four hydrogen atoms. (Mauseth, J.D. 1995. *Botany: an introduction to plant biology*. 2nd edn. Philadelphia: Sanders College Publishing: 22.) Answer: **For example**

12.1	
12.2	
12.3	

12.1 Farming has been carried out in Ireland for the last 7,000 –8,000 years and up to the mid-20th Century its development was measured in small and gradual changes. **However**, since the 1950's and 60's changes have been taking place at an ever increasing pace.

(Bell, P. 1996. *Environmental farming: a guide to the Rural Environment Protection Schemes (REPS)*. Philip Farrelly & Company: ii.)

12.2 [...] the use of antibiotics for routine sub-culture or in stock cultures should be discouraged because low levels of bacterial or fungal contamination may be masked and may cause problems at a later date. **Furthermore**, extensive use of antibiotics may cause selective retention of antibiotic-resistant contaminants which can cause future problems.

(Butler, M. 1996. *Animal cell culture and technology: the basics*. Oxford: IRL Press: 31.)

12.3 **In summary**, the color of the sky gives an indication of the number of large or small particles present. Lots of small particles produce red sunsets, whereas large particles produce a white sky.

(Lutgens, F.K. and E.J. Tarbuck. 1998. *The atmosphere*. 7th edn. London: Prentice-Hall International, Inc.: 36.)

13. Write the <u>noun</u> which corresponds to the process or action described. The verbs from which the nouns are formed are given in the box below. The first two are done for you.

defoliate	deforest	emerge	feed	isolate	nitrify	weather

13.1	Remove leaves from plants.	**defoliation**
13.2	Changing state of soil or rock through the influence of the climate (rainfall, hot sun, frost, etc.) or by chemical pollutants present in the rain or the atmosphere.	**weathering**
13.3	Process by which bacteria found in the soil break down complex nitrogen compounds and form nitrates which plants can absorb.	
13.4	Cutting down forest trees to make arable land.	
13.5	Action of giving animals food to eat.	
13.6	Keeping infected animals away from others.	
13.7	Stage in the growth of a plant, when the new shoot or stalk appears through the surface of the soil.	

(*Dictionary of agriculture*. 1990. Teddington: Peter Collin Publishing.)

Pre-test 4
Texts used in questions:

1.
Saunders, P.J. 1998. Effect of sowing date and disease development on yield of winter combining pea varieties. *Tests of Agrochemicals and Cultivars*. 19. (*Annals of Applied Biology*. 132 Supplement): 46.

7.
Schuppli, C.A. and D. Fraser. 1999. A framework for assessing the suitability of different species as companion animals. *Animal Welfare*. 9: 359-360.

9.
Tansey, G. and T. Worsley. 1995. *The food guide system*. London: Earthscan Publications: 49.

11.
Jones, A., R. Duck, R. Reed and J. Weyers. 2000. *Practical skills in environmental science*. Harlow: Prentice Hall: 265.

APPENDIX 7

Course post-tests

POST-TESTS – TEST 1
(1 hora)

Leia o texto que se segue tirado da *Revista Portuguesa de Zootecnia*. **À medida que vai lendo** o artigo responda **em Português** às perguntas de interpretação referentes a cada secção no espaço em branco a seguir à pergunta.

Este teste será classificado em função:
a) do tempo que demorar a fazê-lo
b) do número de respostas que completar

Este teste tem a duração máxima de 1 hora. Ao iniciar e ao terminar o teste assinale as horas na tabela abaixo de modo a que a duração do teste possa ser contabilizada.

	HORAS
INÍCIO DO TESTE	
FIM DO TESTE	

Araújo, J.P., J. Colaço e J. Oliveira. 1998. Estimação dos parâmetros e tendências genéticas e ambientais para a idade ao primeiro parto e intervalo entre partos na raça bovina Barrosã. *Revista Portuguesa de Zootecnia*. 5. 2: 51-62.

Estimação dos parâmetros e tendências genéticas e ambientais para a idade ao primeiro parto e intervalo entre partos na raça bovina Barrosã

Introdução

A raça bovina Barrosã, considerada como uma das mais representativas e conhecidas em Portugal pela qualidade da sua carne (Lima, 1875; Tierno, 1908), conheceu, principalmente no final do século XIX, o seu período áureo. A exportação de bovinos para Inglaterra era "repasto" favorito de reis e príncipes (Leite, 1991). De tal forma conhecida, que alguns restaurantes londrinos usam o nome "Portuguese Beef" para publicitarem a excelente carne que os seus antepassados comiam (Leite, 1991). A partir da década de cinquenta, os efectivos desta raça diminuíram drasticamente, apontando-se para a sua extinção. Entre 1981 (entrada em funcionamento do Registo

Zootécnico) e 1996, o quantitativo acumulado de vacas inscritas cifra-se em 38.002 (AMIBA [Associação do Minho dos Criadores de Bovinos de Raça Barrosã], 1997), estimando-se que actualmente existam menos de 10.000 vacas.

Em melhoramento animal, a estimativa de componentes de (co)variância (Henderson, 1953) é essencial na predição dos valores genéticos dos animais (Groeneveld e Kovac, 1990). A variação genética de certas características como as reprodutivas, viabilidade, velocidade de crescimento e eficiência de conversão alimentar dependem da magnitude das variâncias genéticas e das heritabilidades (Mohiuddin, 1993), constituindo, juntamente com as correlações genéticas, os parâmetro mais importantes (Maijala e Hanna, 1974).

Para Koots *et al.* (1974) as estimativas de heritabilidades são condicionadas por factores como: a característica em causa, a raça, o país, o maneio alimentar, o método de estimação, o sexo, a origem dos dados (explorações vs estações), a população alvo e o número de registos envolvidos (Preston e Willis, 1974). Dado que a heritabilidade de uma característica é específica de determinada população (Van Vleck *et al.*, 1987), não parece ser correcto a utilização de estimativas efectuadas numa população para generalizar a sua aplicação noutra(s). Daqui se infere a necessidade de efectuar estimativas nas nossas raças nacionais. Segundo Colaço (1989), a elaboração e execução de um plano para a recolha sistemática no campo de dados relativos a características de importância económica em bovinos autóctones, permitirá a constituição de um banco de dados. De referir, no entanto, a dificuldade na obtenção de informação sobre dados reprodutivos a partir de criadores com gestão ineficiente e efectivos reduzidos, como é o caso das raças autóctones do Norte do nosso país. Tal facto obriga a pesquisa de dados centralizados na Associação de Produtores (gestora do Livro Genealógico), dada a comunicação de nascimentos, cobrições e partos por parte dos criadores à respectiva Associação.

A constituição do referido banco de dados, mediante a utilização de um modelo animal e a metodologia do modelo misto, possibilitará estimar, entre outros, parâmetros genéticos. A metodologia do modelo misto é prática na maioria das aplicações de melhoramento animal (Henderson, 1975), ao permitir efectuar a avaliação genética, a estimativa de parâmetros genéticos, a identificação de influências ambientais e a estimativa de tendências genéticas (Kennedy, 1990). Paralelamente, a estimativa de tendências genéticas e ambientais, permite avaliar a eficácia dos procedimentos de selecção, controlar as condições de maneio em geral (Kovac e Groeneveld, 1990), comparar actuais tendências com outras hipotéticas, e facilitar a estimativa não distorcida de factores de correcção para efeitos ambientais sistemáticos (Harville e Henderson, 1967).

A utilização do método BLUP (Best Linear Unbiased Prediction) adequa-se igualmente na predição dos valores genéticos, podendo usar-se registos provenientes de explorações com efectivos reduzidos (Sasaky, 1992).

Deste modo, pretendemos questionar e mostrar alguns problemas existentes na raça bovina Barrosã, tentando colmatar uma lacuna na informação existente. Por outro lado, queremos mostrar algumas alternativas para a possível evolução e ou manutenção genética das nossas raças autóctones.

1. Onde foram obtidos os dados utilizados neste estudo?

Material e Métodos

O presente estudo realizou-se a partir da informação disponível no Registo Zootécnico da Raça Bovina Barrosã.

Constituímos um ficheiro com os elementos constantes nos "contrastes reprodutivos" de vacas, considerando a data da primeira fecundação e seguintes, a identificação dos touros que as beneficiaram, as respectivas datas de parto, incluindo-se igualmente a data de nascimento, a genealogia (somente as inscritas no Registo de Nascimento) e a localização geográfica. Partindo-se de uma amostra de 500 vacas, foi efectuada uma triagem da informação disponível, eliminando-se vacas com: idade à primeira fecundação superior aos 36 meses; idade ao primeiro parto superior aos 44 meses; gestações inferiores a 265 dias e superiores a 300 dias; intervalos entre partos inferiores a 315 dias e superiores a 575 dias; intervalos entre partos e fecundações inferiores a 25 dias e superiores a 275 dias. Após a edição a amostra ficou reduzida a 298 vacas, nascidas entre 1982 e 1991. Deste modo, ficámos com 1518 animais envolvidos nas diferentes genealogias.

Face às diferenças fisiográficas da área de produção desta raça, dividimos esta em três zonas: várzea, intermédia e montanha. Na várzea (altitude inferior a 400 m) abrangemos as veigas situadas nos concelhos de Amares, Arcos de Valdevez, Fafe, Guimarães, Monção, Terras de Bouro e Vila Verde; na intermédia (altitude entre os 400 m e 700 m) incluímos povoações localizadas nas encostas nos concelhos de Arcos de Valdevez, Cabeceiras de Bastos, Monção, Montalegre, Paredes de Coura, Póvoa de Lanhoso, Terras de Bouro, Vieira do Minho e Vila Verde; na montanha (altitude superior a 700 m) incluímos povoações situadas em Boticas, Melgaço, Montalegre e Vieira do Minho.

2. Quais foram os critérios para a escolha das vacas a reter na mostra estudada?

3. Em quantas zonas geográficas foi dividida a área de produção da raça bovina Barrosã?

Para estimativa dos parâmetros genéticos da idade ao primeiro parto e do intervalo entre partos seguimos a metodologia REML – Restricted Maximum Likelihood (Patterson e Thompson, 1971), utilizando o programa computacional VCE – Variance Component Estimation, desenvolvido por Groeveveld (1996). Para estimar funções de efeitos ambientais e efeitos genéticos utilizámos a metodologia BLUP – Best Linear Unbiased Prediction através do programa PEST – Prediction and ESTimation (Groeneveld 1990).

O modelo misto univariado usado para a idade ao primeiro parto foi o seguinte:

$$y_{ijkl} = Mn_i + An_j + Z_k + a_l + e_{ijkl} \qquad (1)$$

onde:

y_{ijkl} – é a observação relativa à idade ao 1° parto do $l^{ésimo}$ animal, que nasceu no $i^{ésimo}$ mês do $j^{ésimo}$ ano na $k^{ésima}$ zona;

Mn_i – representa o efeito fixo do $i^{ésimo}$ mês de nascimento, sendo i = 1,..., 12;
An_j – representa o efeito fixo do $j^{ésimo}$ ano de nascimento, sendo j = 1982,..., 1991;
Z_k – representa o efeito fixo da $k^{ésima}$ zona, sendo k = 1, 2, 3;
a_l – representa o efeito aleatório do valor genético aditivo do $l^{ésimo}$ animal, sendo l = 1,..., 1518;
e_{ijkl} – representa o erro aleatório associado a cada observação y_{ijkl}

Para o intervalo entre partos, as características envolvidas no modelo misto multivariado foram o 1°, 2° e 3° intervalos, com a seguinte forma para cada um deles:

$$y_{ijk} = pl_i + Z_j + a_k + e_{ijk} \qquad (2)$$

onde:

y_{ijk} – é a observação relativa ao intervalo entre partos do $k^{ésimo}$ animal, com a $i^{ésima}$ idade ao primeiro parto, na $j^{ésima}$ zona;
pl_i – representa o efeito aleatório da $i^{ésima}$ idade ao primeiro parto;
Z_j – representa o efeito fixo da $j^{ésima}$ zona, sendo j = 1, 2, 3;
a_k – representa o efeito aleatório do valor genético aditivo do $k^{ésimo}$ animal, sendo k = 1,..., 1518;
e_{ijk} – representa o erro aleatório associado a cada observação y_{ijk}

4. Quais são as duas características estudadas neste trabalho?

Resultados e Discussão

Os resultados relativos à idade do primeiro parto e ao intervalo entre partos referem-se aos valores observáveis ou mensuráveis a partir de registos de 266 vacas (Quadro I). Os efeitos genéticos e ambientais são os componentes principais da expressão fenotípica das características, justificando-se a sua avaliação para cada uma delas.

QUADRO I – MEDIDAS DE TENDÊNCIA CENTRAL E DE DISPERSÃO DAS CARACTERÍSTICAS ESTUDADAS.

Características	N	Média (dias)	D.P.	Valor mínimo	Valor máximo
Idade ao primeiro parto	266	917,9	133,6	719	1331
1° intervalo entre partos (IP1)	266	428,0	55,7	317	550
2° intervalo entre partos (IP2)	165	404,6	51,9	323	550
3° intervalo entre partos (IP3)	98	388,5	44,3	318	517

D. P. Desvio padrão

As fêmeas são descendentes de 98 touros e 272 vacas, encontrando-se envolvidos nas diferentes genealogias 1518 animais com os níveis de consanguinidade apresentados no Quadro II. O coeficiente de consanguinidade médio para os animais com endogamia foi de 16%, com o valor máximo de 25%.

QUADRO II – NÍVEL DE CONSANGUINIDADE.

C. consanguinidade (%)	0	0<5	5<10	10<15	25<30	Total
N.º de animais	1503	1	1	8	5	1518

5. Quais são os dois efeitos gerais que influenciam a idade ao primeiro parto e os intervalos entre partos?

Estimação dos parâmetros e tendências genéticas, ambientais e fenotípicas para a idade ao primeiro parto

O valor da heritabilidade estimada para a idade ao primeiro parto (Quadro III) é praticamente nulo, sendo semelhante aos obtidos por Bourdon e Brinks (1982) e Sadana e Tripathi (1987), com raças bovinas em clima temperado, e por Stobbs (1966), e Haile e Kassa (1994), com raças tropicais. No entanto, a estimativa obtida revelou-se inferior à obtida por Alegre *et al.* (1987), com a raça Alentejana.

QUADRO III – ESTIMATIVAS DAS VARIÂNCIAS GENÉTICA, AMBIENTAL E FENOTÍPICA PARA A IDADE AO PRIMEIRO PARTO.

Parâmetros	Idade ao primeiro parto
Variância genética (σ^2_a)	135,56 (1363,13)
Variância ambiental (σ^2_e)	14901,43 (1595,71)
Variância fenotípica (σ^2_p)	15036,99
Heritabilidade (h^2)	0,01 (0,09)

Erro padrão da estimativa entre parêntesis

As estimativas das diferenças entre ambientes foram extraídas directamente das soluções para os efeitos mês de nascimento, ano de nascimento e zona geográfica, expressas como desvios relativos ao mês de Janeiro, ano de 1982 e à zona de várzea, respectivamente.

O nível genético médio foi obtido a partir dos resultados da avaliação genética (Henderson *et al.*, 1959). Dado que os valores genéticos são cumulativos com o evoluir do tempo, os valores médios de todos os animais nos tempos t_1, t_2...t_n, reflectem o nível genético médio da população para cada tempo, expressos como os desvios a partir da população de base (animais nascidos antes de 1982). As médias das estimativas dos valores genéticos das vacas em cada classe (mês, ano de nascimento e altitude) são sempre próximas de zero (Figs. 1, 2 e 3), assemelhando-se às obtidas por Haille e Kassa (1994). De referir a constituição da amostra por fêmeas nascidas num espaço temporal reduzido (entre 1982 e 1991), e a reduzida variância genética aditiva para esta característica.

As tendências ambientais acompanham as fenotípicas, apresentando grande variabilidade. Sugerem, assim, que as diferenças verificadas na idade ao primeiro parto são maioritariamente afectadas por efeitos ambientais.

Ainda relativamente ao mês de nascimento, verifica-se a tendência da obtenção de idades inferiores ao primeiro parto para as fêmeas nascidas no Inverno e início da Primavera, e superiores para as nascidas em Julho (Fig. 1).

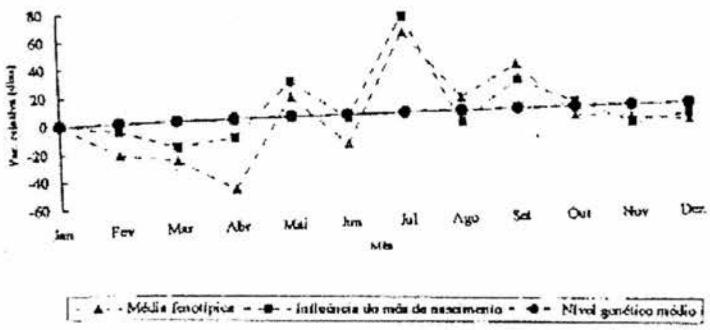
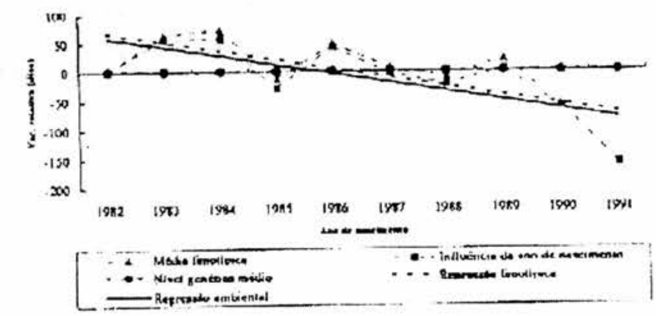


Figura 1. Influência do mês de nascimento na idade ao primeiro parto.

Para o ano de nascimento, verifica-se a tendência positiva para a diminuição da idade ao primeiro parto (Fig. 2), justificando-se parcialmente pela melhoria das condições de recria das novilhas e/ou aconselhamento técnico (influência ambiental).



Regressão fenotípica Y = -15,532 X+82,606; r^2=0,49

Regressão ambiental Y = -15,500 X+71,363; r^2=0,53

Figura 2. Influência do ano de nascimento na idade ao primeiro parto.

As condições ambientais da zona geográfica revelam igualmente um efeito nesta característica, destacando-se as idades inferiores ao primeiro parto nas zonas de várzea e de montanha (Fig. 3). A ausência de elevados percursos por parte das novilhas e a melhoria das condições de alimentação na zona de várzea (maior proximidade do assento de lavoura), e o melhor acompanhamento dos animais na zona de montanha (melhor valorização dos animais) podem justificar estas diferenças.

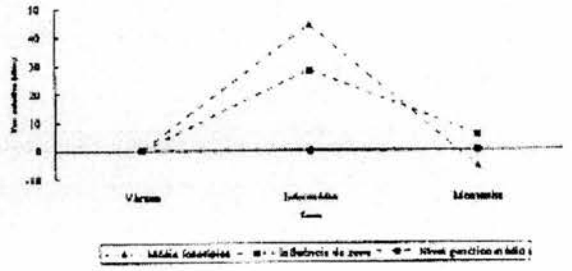


Figura 3. Influência da zona geográfica na idade ao primeiro parto.

6. Quais são as componentes do ambiente consideradas neste estudo?

Estimação dos parâmetros e tendências genéticas, ambientais e fenotípicas para o intervalo entre partos

Para o primeiro, segundo e terceiro intervalos entre partos foi usado um modelo misto multivariado [2], do qual resultaram as estimativas das (co)variâncias (Quadro IV) e das heritabilidades e correlações (Quadro V).

QUADRO IV – ESTIMATIVAS DAS (CO)VARIÂNCIAS GENÉTICAS E AMBIENTAIS (ENTRE PARÊNTESIS) PARA O INTERVALO ENTRE PARTOS.

Intervalos entre partos	IP1	IP2	IP3
IP1	1893,40	859,72	467,37
	(1323,86)	(-114,53)	(103,20)
IP2		624,82	179,56
		(2175,14)	(181,63)
IP3			119.91
			1884,94)

QUADRO V – ESTIMATIVAS DAS HERITABILIDADES (NA DIAGONAL), CORRELAÇÕES GENÉTICAS (ACIMA DA DIAGONAL) E FENOTÍPICAS (ABAIXO DA DIAGIONAL).

Intervalos entre partos	IP1	IP2	IP3
IP1	**0,59**	0,79	0,98
	(0,19)	(0,33)	(0,19)
IP2	0,25	**0,22**	0,66
		(0,16)	(0,83)
IP3	0,14	0,15	**0,06**
			(0,11)

Erro padrão da estimativa entre parêntesis.

As estimativas das heritabilidades para o primeiro e segundo intervalo entre partos, são superiores às obtidas por Duarte-Ortuño *et al.* (1988), Dias *et al.* (1994) e Haille e Kassa (1994), aproximando-se contudo das estimadas para a raça Alentejana por Alegre *et al.* (1987). A estimativa para o terceiro intervalo entre partos, apesar de valor reduzido, apresenta-se dentro dos referidos na bibliografia. Os valores obtidos sugerem a possibilidade de uma resposta à selecção superior para o primeiro e segundo intervalos entre partos.

A diferença entre os valores obtidos e os encontrados na bibliografia, pode dever-se à metodologia multivariada utilizada na estimativa dos parâmetros genéticos (REML). De facto, grande parte dos trabalhos consultados utilizam o método III de Henderson que não considera a estrutura de parentescos (Henderson, 1984). Assim poderá haver, comparativamente à metodologia REML, uma subvalorização das estimativas (Carabaño *et al.*, 1989; Meyer, 1989). Por outro lado, o tamanho da amostra (n = 298), o reduzido número de descendentes por touro (Ageeb, 1991), e os possíveis erros estatísticos de amostragem (Maijala e Hanna, 1974), poderão provocar a distorção das estimativas dos parâmetros. Um outro aspecto respeita ao facto da maioria das estimativas realizadas contemplar não o primeiro intervalo entre partos, mas sim a totalidade dos mesmos. Haille e Kassa (1994) estimaram heritabilidade para os três primeiros intervalos entre partos, obtendo valores sempre reduzidos. Para os dois primeiros intervalos, os referidos autores justificaram-no pela possível vulnerabilidade de fêmeas jovens Boran (zebu) ao stress ambiental. Finalmente, de referir a possibilidade de ocorrer uma variação dos valores dos parâmetros entre populações e o reduzido número de estimativas comparativamente com outras características (Koots *et al.*, 1994).

As correlações genéticas entre os intervalos entre partos foram elevadas ($\approx$ 0,7 – 0,9), assemelhando-se às obtidas por Alegre *et al.* (1987) e Haille e Kassa (1994). O facto dos intervalos entre partos estarem altamente correlacionados entre si, apesar das heritabilidades diminuírem do primeiro para o terceiro intervalo, pode provavelmente implicar uma resposta genética significativa na diminuição da duração dos 2º e 3º intervalo(s) entre partos a partir da selecção para o primeiro (resposta indirecta correlacionada).

Relativamente ao efeito da zona na duração de cada um dos intervalos entre partos, verificamos uma variação quase nula do valor genético (médias das estimativas dos valores genéticos das vacas em cada zona próximas de zero). Estes resultados são similares aos obtidos por Haille e Kassa (1994). Apesar da reduzida variabilidade fenotípica entre zonas, estas diferenças são essencialmente explicadas por efeitos ambientais (Figs. 4, 5 e 6).

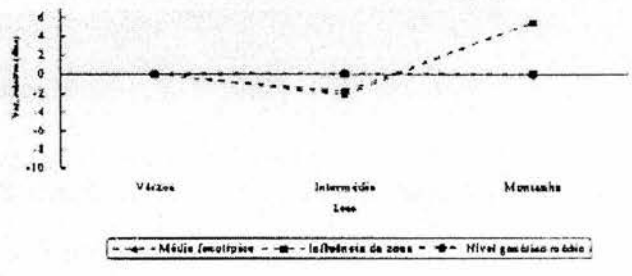


Figura 4. Influência da zona na duração do primeiro intervalo entre partos.

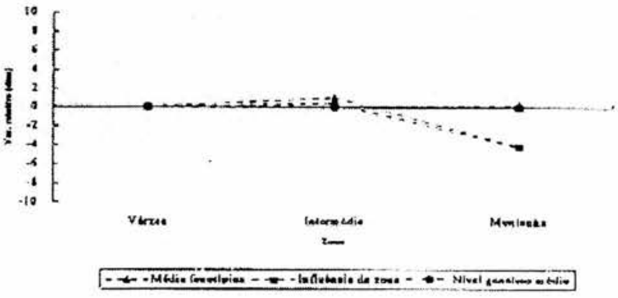


Figura 5. Influência da zona na duração do segundo intervalo entre partos.

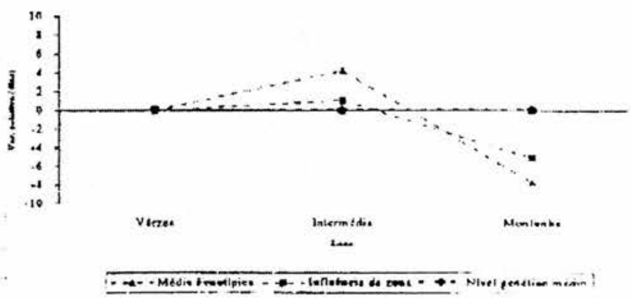


Figura 6. Influência da zona na duração do terceiro intervalo entre partos.

7. Quais são os resultados deste estudo que estão sempre de acordo com a trabalhos referidos na bibliografia?

Conclusões

Pretendeu-se com este trabalho contribuir para o estudo do sistema de produção da raça bovina Barrosã, e identificar ou avaliar algumas das suas características de produção e reprodução no segmento mãe. Ao nível da estimativa de parâmetros genéticos para a idade ao primeiro parto e intervalo entre partos, evidencia-se:

(i) a estimativa da heritabilidade de 0,009 (0,09) para a idade ao primeiro parto, e as estimativas das heritabilidades para o primeiro, segundo e terceiro intervalo entre partos de 0,59 (0,19); 0,22 (0,16) e 0,06 (0,11), respectivamente.

(ii) as correlações genéticas elevadas entre cada um dos intervalos entre partos ($\approx$ 0,7 – 0,9), sugerindo a possibilidade de uma resposta à selecção indirecta para estas características.

(iii) na idade ao primeiro parto, a evolução do nível genético médio quase nulo, considerando os efeitos do mês de nascimento, ano de nascimento, e zona geográfica. As tendências ambientais apresentaram grande variabilidade, acompanhando as fenotípicas.

(iv) a tendência para a obtenção de idades inferiores ao primeiro parto para as fêmeas nascidas no Inverno e início da Primavera e superiores para as nascidas em Julho, e a diminuição da idade ao primeiro parto entre 1982 e 1991.

(v) na duração dos intervalos entre partos, a variação quase nula do valor genético, considerando o efeito da zona. As diferenças fenotípicas entre zonas, apesar de reduzidas, são explicadas essencialmente por efeitos ambientais.

8. Que grupo(s) de vacas apresenta(m) uma idade inferior para o 1° parto?

POST-TESTS – TEST 2
(1 hora)

Leia o texto que se segue tirado do *Journal of Animal Science*. **À medida que vai lendo** o artigo responda **em Português** às perguntas de interpretação referentes a cada secção no espaço em branco a seguir à pergunta.

Este teste será classificado em função:
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b) do número de respostas que completar

Este teste tem a duração máxima de 1 hora. Ao iniciar e ao terminar o teste assinale as horas na tabela abaixo de modo a que a duração do teste possa ser contabilizada.

	HORAS
INÍCIO DO TESTE	
FIM DO TESTE	

Doyle, S.P., B.L. Golden, R.D. Green and J.S. Brinks. 2000. Additive genetic estimates for heifer pregnancy and subsequent reproduction in Angus females. *Journal of Animal Science*. 78.8: 2091-2098.

Vocabulary:

AI breeding – Artificial Insemination reproduction

(to) breed – to reproduce animals in this case calves

calf (plural **calves**) – the young (i.e. baby) of a heifer or cow

(to) calve – to give birth to a calf

(to) cull – to separate or remove cows or heifers from the herd

dam – female parent of a calf (i.e. heifer or cow)

heifer – female cow who has not yet calved or has calved for the first time

herd – group of cows

weaning – the time when a calf can feed independently of the milk source of its mother (i.e. heifer or cow)

yearling – animal (i.e. calf or heifer) aged between one and two years

Additive genetic parameter estimates for heifer pregnancy and subsequent reproduction in Angus females

Introduction

Efficient production in any species depends on the production of females, reproduction, and progeny growth (Dickerson, 1970). For a commercial cow/calf producer whose primary goal is to produce a live, healthy calf annually, no factor plays a more vital role than the reproductive fitness of females. Willham (1973) reported that, at the commercial level, reproduction was ten times as important as growth and twenty times greater than end-product attributes. Recently, Melton (1995) reported that the theoretical relative economic value of reproduction was 3.24 times greater than that of consumption attributes. Both emphasize the importance of reproduction to productivity at the commercial cow/calf level.

Improving reproductive performance depends on the reproductive fitness of replacement heifers, 2-yr-old cows, and the mature cow herd. Due to the large investment of time and resources associated with replacement heifer development, much of the success of an operation depends on getting heifers bred and calved by the age of 2 yr. This must then be followed with keeping them in the herd long enough to produce a minimum number of calves to cover their expenses and a share of those associated with cows that fall out of the herd early in their production cycle. Therefore, it is important to select those heifers with higher genetic potential for fertility that will breed early in their first season to calve as 2-yr-olds and then continue to rebreed and calve early every year as mature females.

There were two primary objectives for this study pertaining to the improvement of female fertility in beef cattle. The first objective was to determine if heifer pregnancy and subsequent rebreeding were heritable traits in an experimental population of Angus cattle. The second objective was to determine the nature of the additive genetic relationships among heifer pregnancy, subsequent rebreeding, and stayability in the same experimental population of Angus cattle.

1. Qual/quais é/são o(s) objectivo(s) do presente estudo?

Materials and Methods

Data Source

Data for this study were obtained from the John E. Rouse Colorado State University Beef Improvement Centre (**CSU BIC**), Saratoga, WY. The CSU BIC has an average elevation of 2,195 m and receives approximately 23 to 33 cm of annual precipitation, primarily as snow. The ranch consists of approximately 3,000 ha, including 320 ha of irrigated meadows, 400 ha of improved crested wheatgrass, and 2,280 ha of native sagebrush range (Schons et al., 1985; Schafer, 1987). Cattle are maintained on grass or meadows year round, with supplemental hay fed during winter months.

The CSU BIC's breeding program emphasizes fertility, maternal ability, low pulmonary arterial pressure, and early growth while maintaining moderate mature size. A more detailed history of the ranch has been documented by Schons et al. (1985), Schafer (1987), and Schafer et al. (1990).

Heifer Management. Yearling heifers were managed separately from the cow herd. Heifers were examined and reproductive tract scores obtained 1 mo before the start of the breeding season the reproductive tract scores suggests that most heifers were cycling or would be cycling by the start of the breeding (Mathiews et al., 1995).

Heifers were synchronized using Syncro-Mate-B (Merial, Athens, GA) and were implanted to allow synchronized breeding the first of June each year. The yearling heifers were bred approximately 2 to 3 wk before the cows. One day following the AI breeding, animals were assigned to single-sire natural service cleanup pastures. Pregnancy examination via rectal palpation occurred 60 d after AI breeding and again at weaning (an approximately 120-d pregnancy observation), and nonpregnant and late-bred females were culled. Heifers were calved and managed after calving separately until their second breeding season.

Cow Management. Cows were maintained on grass throughout the year with supplemental hay fed during winter months. Two- and three-yr-old cows, thin cows, and older cows were managed separately during winter to ensure adequate energy balance.

As with the heifers, cows were synchronized with Syncro-Mate-B (Merial) and were implanted the second week of June. Implants were removed from approximately one-half of the cows 9 d later and from the other half 10 d later. It was believed that essentially all cows were cycling at the initiation of the estrous synchronization protocol based on homosexual activity among the cows at pasture. (Mathiews et al., 1995). Calves were removed at the time of implant removal to further promote cyclicity. Calves were returned to their dams following AI (48 h).

Cows were bred by AI approximately 12 h after estrus detection over a 2-d period. Those females not displaying estrus were time-inseminated approximately 54 h after implant removal. Similarly with the heifers, cows were placed into single-sire natural service cleanup pastures approximately 1d after AI breeding. Pregnancy examination via rectal palpation occurred 60 d after AI breeding and at weaning (pregnancy observation at approximately ~105 d). Nonpregnant, late-bred, and a low number of thin, old cows were culled at weaning.

2. Quais foram os critérios para eliminar vacas da experiência?

Heifer Pregnancy Analysis

Data Description. Heifer pregnancy was defined as the observation of a heifer conceiving and remaining pregnant to palpation, given exposure during the breeding season. Weaning palpation records were used in the analysis of heifer pregnancy and represented a 120-d pregnancy record. Pregnant heifers were coded as "1" and nonpregnant females were coded as "0".

Data included 1,326 records from heifers born in the years 1985 through 1993. Preliminary data editing removed 27 animals with no unique individual identification, pregnancy observation, cleanup sire identification, and (or) age of dam observation. The resulting heifer pregnancy data included 1,299 animals within 24 contemporary groups ranging in size from 45 to 64 heifers.

The average heifer pregnancy rate was 89.2%, with a high of 95.7% in 1990 and a low of 76.6% in 1991. The low pregnancy rate in 1991 reflected the use of the CSU BIC yearling heifers in a research project involving evaluation of Synovex-C (Fort Dodge Animal Health, Overland Park, KS) implant use on growth rate, pelvic measurements, and reproductive performance (Rusk, 1992).

Subsequent Rebreeding Analysis

Data Description. Subsequent rebreeding was defined as the observation of a 2-yr-old conceiving and remaining pregnant to palpation, given pregnancy as a yearling and exposure during the breeding season. Two-year-old females were coded similarly to the heifers with rebred animals denoted by "1" and nonpregnant females by "0". As in the heifer pregnancy analysis, the weaning palpation record was used in the analysis but represented approximately a 105-d pregnancy observation in the 2-yr-old females.

After editing record with no unique individual cow identification and (or) rebreeding observation, data included rebreeding pregnancy observations on 789 2-yr-olds from the 1986 through 1994 breeding seasons. Further data removal for lack of within contemporary group variation reduced the number of usable subsequent rebreeding observations to 558 2-yr-olds within 33 contemporary groups. The average rebreeding pregnancy rate was 91.9% over 9 yr. Rebreeding pregnancy rates have ranged from a minimum of 86.9% in 1987 to a maximum of 96.2% in 1990.

Stayability Analysis

Data Description. Stayability was defined as the probability of a female having at least five calves, given she becomes a dam as a 2-yr-old (Snelling et al., 1995). Dams were assigned a "1" for a successful stayability observation and "0" if unsuccessful. Twins were counted as a single calving observation. Data include 3,109 dams born in the years 1958 through 1989. The average success rate for stayability of 37.7% agreed with earlier research performed on the same herd using data from animals born through 1986 (Snelling, 1994).

Statistical Procedure

Heifer pregnancy, subsequent rebreeding, and stayability were analyzed using a maximum *a posteriori* probit threshold model (Gianola and Foulley, 1983; Harville and Mee, 1984) in the prediction of animals' genetic merit on the underlying scale. In addition, Method $\Re$ (Reverter etal., 1994; Snelling et al., 1995) was used for the estimation of variance components for the three traits of interest. [...]

3. Qual o número mínimo de bezerros que uma novilha tem de parir para se considerar que satisfaz o critério de selecção (*stayability*) para esta população?

Groups Analysis

In order to determine the nature of the potential relationship between heifer pregnancy and stayability, an animal model with additive genetic groups (Golden et al., 1994) was applied. Groups analysis is an alternative method for describing the additive genetic relationship between the two traits and avoids a computationally burdensome bivariate threshold analysis. More importantly, using additive genetic grouping this way can reveal a nonlinear additive genetic relationship between traits.

Table 1. Available pedigree structure for heifer pregnancy (HP), subsequent rebreeding (SR), and stayability (S(5/1)) for both single-trait analyses of variance components and breeding value estimation (EBV)

Pedigree	No. animals	No. sires	No. dams	No. foundation animals	No. zero elements in A^{-1}
HP	2,048	130	1,080	549	11,598
SR	1,461	114	869	491	7,771
S(5/1)	3,726	119	1,847	2,095	16,534
EBV	20,445	226	4,592	10,412	97,767

Additive genetic groups and subsequent group equations were formed following procedures described by Westell et al. (1988) for each trait. Animals with at least one unknown parent (foundation animals) were assigned to genetic groups, representing low, intermediate, and high breeding values. In the first analysis, we included additive genetic groups for heifer pregnancy as a fixed effect in the prediction of estimated breeding values for stayability. In a second analysis, we included additive genetic groups of stayability as a fixed effect to predict estimated breeding values for heifer pregnancy. The animal model for the analysis of heifer pregnancy with stayability genetic group effects included the fixed effects of age of dam, contemporary group as defined previously in the single-trait analysis of heifer pregnancy, additive genetic group effect of stayability, and age as a covariate. The animal model for stayability with heifer pregnancy genetic group effects included the fixed effects of birth year contemporary group and additive genetic group effect of heifer pregnancy. Both group effect analyses included the random additive genetic effects of animal and residual error. The low additive genetic group in each analysis was constrained to zero. Predicted breeding value solutions on the underlying scale for each trait were obtained using a maximum *a posteriori* probit threshold model (Gianola and Foulley, 1983; Harville and Mee, 1984) using h^2 estimates from the single-trait analyses for each trait.

4. Para além das análises aos traços únicos (*single-trait analyses*) quantos grupos de análises foram feitos?

Results and Discussion

Heifer Pregnancy

The average and median h^2 estimates for heifer pregnancy were .21 (Table 2) and .20, respectively. Of the 200 subsamples obtained from Method $\mathfrak{R}$, only 183 produced point estimates of h^2 within the parameter space (Figure 1). Thus, the single-trait animal model for heifer pregnancy was inappropriate for the data 8.5% of the time.

Previous research of heifer fertility on the observed scale has included such measures as pregnancy, conception, and calving rates. Most have concluded that heifer fertility was lowly heritable and the response to selection would be minimal (Dearborn et al., 1973; Milagres et al., 1979; Koots et al., 1994); however, Hetzel et al. (1989) reported making large responses in selection for fertility. Buddenberg et al. (1989) examined the h^2 of pregnancy on both the observed and underlying scales in Angus, Hereford, and Polled Hereford females bred to calve at 3yr of age and raised under Ozark range conditions. For Angus, h^2 estimates were .17 and .34 on the observed and underlying scales, respectively. Heritability estimates for Hereford and Polled Hereford were .04 and .05 on the observed scale and .08 and .10 on the underlying scale, respectively. Their research suggested that the h^2 on the observed scale tended to be lower than the h^2 estimated on the underlying scale.

The h^2 estimates for heifer pregnancy in this study were not different from more recent reports on heifer pregnancy and the use of threshold analytical procedures in the estimation of variance components. Snelling et al. (1996) obtained average h^2 estimates of .21 and .30 for linecross and Line 1 Herefords from Ft. Keogh Livestock and Range Research Laboratory in Miles City, MT. Furthermore, Evans et al. (1999) reported an h^2 estimate of .14 on the underlying scale for Hereford cattle from field data. Results from this study in conjunction with those from Snelling et al. (1996) and Evans et al. (1999) suggest that heifer pregnancy seems more heritable than previously reported, with higher estimates of h^2 likely being due to the use of more appropriate analytical procedures for categorical data.

5. Em que difere o resultado do presente estudo dos estudos anteriores acerca da capacidade reprodutora de novilhas?

Table 2. Number of random 50% subsample, h^2, standard deviation (SD), standard error of the mean h^2 (SE), and 95% confidence interval (CI) for heifer pregnancy (HP), subsequent rebreeding (SR), and stayability (S(5/1))

Trait	No. subsample	h^2	SD	SE	CI
HP[a]	200	.27	.24	.017	.000 to .671
	183	.21	.12	.009	.59 to .440
SR[b]	162	.12	.17	.013	.000 to .395
	87	.19	.14	.015	.018 to .495
(S(5/1))[c]	118	.14	.09	.008	.001 to .288
	111	.15	.08	.008	.036 to .304

[a]Of the 200 subsamples obtained from Method ℜ, 183 produced point estimates of h^2 within the parameter space.
[b]Of the 162 subsamples obtained from Method ℜ, 87 produced point estimates of h^2 within the parameter space.
[c]Of the 118 subsamples obtained from Method ℜ, 111 produced point estimates of h^2 within the parameter space.

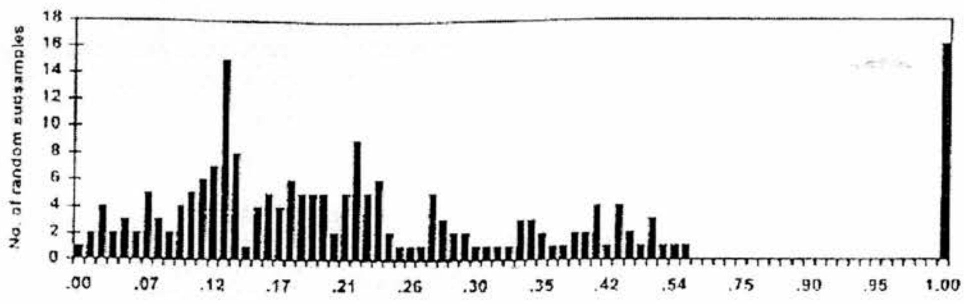

Figure 1. Heritability estimates for yearling Angus heifer pregnancy.

Fixed-effect solutions for age of dam and age on the probability and underlying scales, their associated standard deviations, and *P*-values are presented in Table 3. The fixed effect of age of dam was significant; however, the effect of age did not appear to be a significant factor in determining whether a heifer became pregnant or not. Heifers out of 4-yr-old dams were 14% less likely to become and remain pregnant to 120 d compared with heifers out of mature dams. Snelling et al. (1996) and Evans et al. (1999) both reported significant age of dam effects on the probability of becoming pregnant. Snelling et al. (1996) reported linecross Hereford heifers out of younger dams had lower probabilities of pregnancy compared with those of older dams; however, in Line 1 Herefords, heifers out of 3-yr-olds had lower probabilities of becoming pregnant vs heifers out of dams belonging to other age groups. Evans et al. (1999) reported heifers out of 2-yr-old dams were 10% less likely to conceive and remain pregnant than heifers out of mature cows. Evans et al. (1999) further reported a significant age effect, citing a 10% advantage in probability of pregnancy for every 20 d earlier a heifer was born in the calving season.

Table 3. Estimates of age of dam (AOD) and age effects on heifer pregnancy on both the percent probability (% probability) and underlying scales (MAP) with corresponding standard deviations (SD) and P-values.

Effect	% probability	MAP	SD (MAP)	P > F
		AOD, yr		
2	- 7.15	- .180	.197	.00
3	- 5.57	- .140	.162	
4	-14.28	- .366	.168	
5-9	.00	.000	.000	
10	25.27	.683	.449	
11	-11.02	- .280	.341	
12	9.41	.238	.413	
13+	-6.50	- .164	.281	
		Aged, d		
	.11	.003	.004	.14

Estimated breeding values expressed as percent probabilities were obtained for heifer pregnancy using the average h^2 of .21. The average estimated breeding value for all animals in the pedigree, for sires, and their range were .14, .09, and –23.87 to 20.02, respectively. There appears to be adequate variation among animals for heifer pregnancy in the CSU BIC herd to make selection decisions for the purpose of promoting higher reproductive rates among replacement heifers.

Subsequent Rebreeding

The average and median h^2 estimates for subsequent rebreeding were .19 (Table 2) and .02, respectively. Of the 162 subsamples, only 87 produced point estimates for subsequent rebreeding h^2 within the parameter space (Figure 2), which is at least in part due to the small number of subsequent rebreeding observations available for analysis and the 50% repeated subsampling procedure of Method $\mathfrak{R}$.

Previous h^2 estimates of rebreeding rate ranged from 0 in Hereford cattle to .18 in Angus females when estimated on the observed scale (Buddenberg et al., 1989); however, transformation to the underlying scale via probit transformation increased the h^2 in Angus females to .32. Recent research by Snelling et al (1996) supports Buddenberg et al. (1989), finding h^2 of .002 and .01 for linecross and Line 1 Herefords, respectively, on the observed scale vs h^2 of .17 and .49 on the underlying scale using threshold procedures for variance component estimation. Although subsequent rebreeding appears to be heritable in Hereford and Angus cattle (Buddenberg et al., 1989; Snelling et al., 1996), it is difficult to conclude that subsequent rebreeding is heritable in the CSU BIC Angus female population, with approximately half of the subsamples failing to produce h^2 estimates within the parameter space. Rebreeding success of 2-yr-olds appears to be due to circumstances and conditions, physical and (or) environmental, that have yet to be quantified in this population.

Stayability Analysis

The average and median h^2 estimates (Table 2) for stayability were .15 and .14, respectively. The analysis of stayability yielded estimates of h^2 out of the parameter space 5.9% of the time (Figure 3).

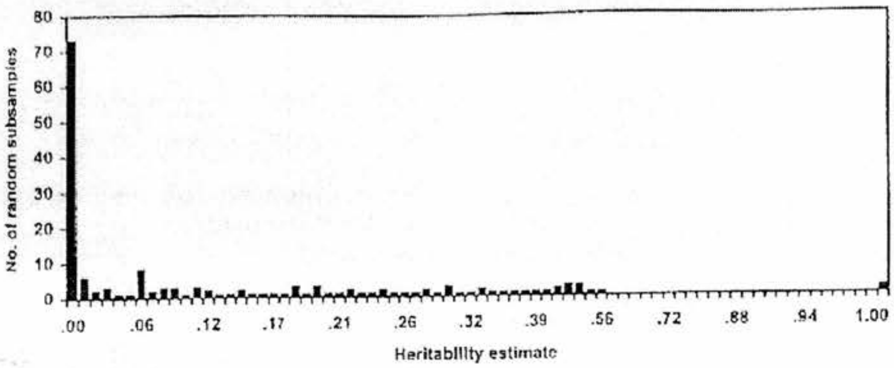

Figure 2. Heritability estimates for subsequent rebreeding in Angus 2-yr-olds.

Snelling et al. (1995) first estimated h^2 for stayability in the same herd, representing females born through 1986. Using animal model Method $\Re$ and animal model marginal maximum likelihood, Snelling and coworkers obtained h^2 for stayability of .23 and .14. Our estimate of stayability is slightly lower than that reported previously for the same herd; however, the h^2 estimate of .23 for stayability is the mean estimate from Method $\Re$ of five usable subsamples. Heritability estimates from this study agree with those obtained in Red Angus field data (Snelling et al., 1995). Results obtained here along with those of Snelling et al. (1995) suggest that stayability is heritable in this population.

Genetic predictions were obtained using the average h^2 estimate of .15. The average EBV for all animals, for sires only, and their range were 3.62, 5.33, and –15.91 to 33.83, respectively. There appears to be adequate variation in EBV to make selection decisions toward improving the stayability in the CSU BIC herd.

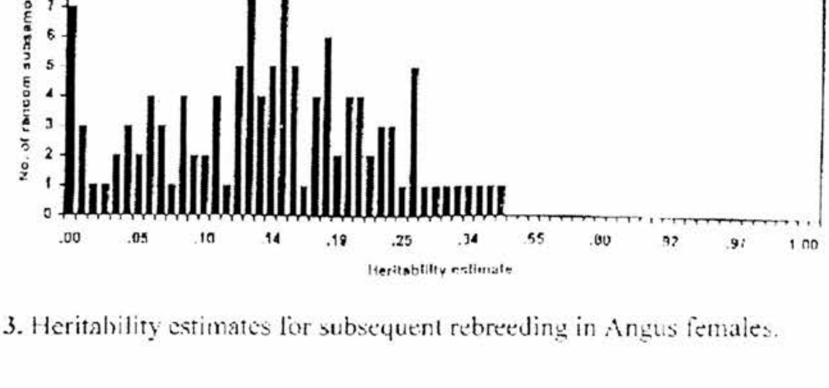

Figure 3. Heritability estimates for subsequent rebreeding in Angus females.

6. Quais são os resultados acerca da hereditariedade no que respeita a partos subsequentes e selecção das novilhas que permanecem na manada (*stayability*)?

Genetic Groups

Three additive genetic groups formed on heifer pregnancy estimated breeding values were used in the analysis of stayability (Figure 4). Differences, based on a minimum of two standard deviations, exist between the three heifer pregnancy additive genetic groups, providing evidence for the existence of a nonlinear relationship between heifer pregnancy and stayability. The difference between the middle and the high heifer pregnancy genetic groups suggests higher heifer fertility appeared favorably related to higher sustained fertility. Lesmeister et al. (1973) reported that heifers with the ability to conceive earlier in their first breeding season calve earlier and wean more calves compared with females breeding later in the breeding season. They tended to continue conceiving earlier in the breeding season and calving earlier through subsequent years. The difference between the low heifer pregnancy group and the middle heifer pregnancy group suggests diminishing returns in stayability beyond the given threshold.

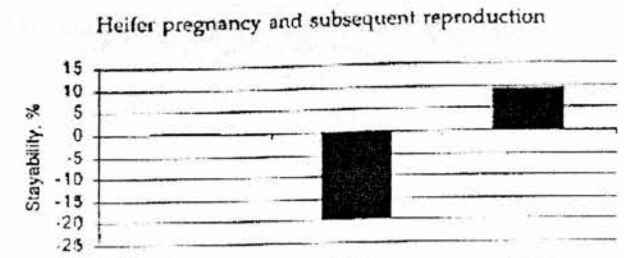

Figure 4. Additive genetic group solution of low, middle, and high heifer pregnancy on stayability expressed as a deviation from the low heifer pregnancy genetic group.

The CSU BIC's previous culling practices may lend evidence for understanding the relationship between heifer pregnancy and stayability. Before 1986, selection favored bulls and cows with genetic potential for growth. Bulls were selected on the basis of their weaning performance, their dam's record, and 120-d gain test performance. Replacement heifers were selected on the basis of their own performance as well as their dam's record. Furthermore, cows were culled primarily on the basis of their calves' weaning weight records, with additional females being culled for structural soundness and pregnancy status in the fall. Genetic trends were positive for weaning weight, postweaning gain, yearling weight, and milk from the late 1950s to 1986 and were .26, .41, .67 and .14kg/yr (Schafer, 1987). The stayability solutions for the heifer pregnancy additive genetic groups may reflect selection processes before implementing the current practice of culling all nonpregnant females at weaning, regardless of their calves' performance records.

An additional analysis was performed fitting three additive genetic groups formed on stayability estimated breeding value in the genetic prediction of heifer pregnancy. The standard deviations for this particular group's analysis were relatively high; stayability genetic group differences were not significantly different from zero and may have been due to random chance.

7. O que é que mudou em 1986?

Implications

More appropriate analytical techniques have made possible more accurate prediction of genetic merit for reproductive traits. As such technology is applied, producers will have the tools to place direct selection on the economically important traits of female reproduction. Incorporating heifer pregnancy probability expected progeny difference into national cattle evaluations would allow producers to select sires with daughters having high breed additive genetic potentials for pregnancy at first breeding. A few breed associations have incorporated stayability expected progeny difference into national cattle evaluations, seeing its benefits in improving the reproductive lifespan of females through sire selection. Using these probability expected progeny differences along with proper nutrition and management would promote favorable responses in female fertility.

8. Qual é a maior implicação deste estudo?

POST-TESTS – TEST 3
(1 hora)

Leia o texto que se segue tirado de *Tests of Agrochemicals and Cultivars*. Escreva o **resumo** do artigo **em Português** nos espaços em branco do Quadro 1 depois do artigo. O quadro serve para não se esquecer de nenhuma secção do texto. Em cada espaço pode escrever uma ou mais frases. No entanto, não se esqueça que um resumo deverá ser tão breve quanto possível.

Este teste tem a duração máxima de 1 hora. Ao iniciar e ao terminar o teste assinale as horas na tabela abaixo de modo a que a duração do teste possa ser contabilizada.

	HORAS
INÍCIO DO TESTE	
FIM DO TESTE	

Tests of Agrochemicals and Cultivars. 20 (1999)
Annals of Applied Biology. 134 (Supplement)

Sensitivity of *Agaricus bisporus* spawn to fungicides

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Key words: Fungicides, *Agaricus bisporus*, spawn, mushroom

Introduction

The expansion of the cultivated mushroom industry in Ireland, based upon *Agaricus bisporus*, has led to the introduction of several fungicides for the control of fungal disease and weed mould epidemics. Experiments to evaluate the fungicides for the control of fungal pathogens, have found that the commercial mushroom strains varied in their sensitivity to the fungicides applied (3). [The evaluation] of effect of fungicides on mycelial growth of *A. bisporus* was already done by growing mushroom *in vitro*, on agar media incorporated with different fungicides (2). This study sought to evaluate the effect of five fungicides applied to *A. bisporus* spawn, on its mycelial growth when grown on agar medium.

Materials and methods

In this experiment, *Agaricus* spawn (colonised wheat grains) supplied by International Spawn Laboratory (Navan, Co. Meath, Ireland) was treated with five fungicides: benomyl (Benlate 50% w.p., Dupont), carbendazim (Derosal 50% w.p., BASF), thiabendazole (Storite 45% e.c., AgVent), prochloraz (Sportak 40% s.c., Schering) and prochloraz+carbendazim as 266:100 g litre^{-1} mixture (Sportak Alpha 36.6%, s.c., Schering) at a dose of 50 mg a.i. kg^{-1} spawn. Stock suspensions and solutions of fungicidal materials were made up in sterilised distilled water at a concentration of 5000 mg litre^{-1}. Measured volumes equivalent to 50 mg a.i. kg^{-1} spawn were spread evenly onto spawn lots and mixed thoroughly. An equivalent volume of sterilised distilled water was mixed with spawn as a control treatment. One grain of fungicide-treated spawn or untreated control was placed on each malt extract agar plate. Each treatment was replicated five times. The inoculated plates were incubated at 25°C in the dark for 14 days, after which the mycelial growth of each colony was measured. Mean values of horizontal and vertical diameters were recorded and statistically analysed using Duncan's multiple range test.

Results

The application of fungicides to spawn at 50 mg a.i. kg^{-1} (Table 1) showed that only one of the fungicide treatments (carbendazim) significantly reduced the mycelial growth of *A. bisporus* on agar plates compared with the control treatment. There was no significant difference between the five fungicides compared in their effect on the mycelial growth of *A. bisporus*.

Discussion

In the use of fungicides in mushroom production, information on crop sensitivity is crucial (3). This study indicates that in the development of new mushroom strains, tolerance to fungicides could be easily included in performance testing using the spawn treatment technique. In a previous study (1), *in vivo*, an increase in mushroom yield was reported when benomyl and thiabendazole were applied to compost at low doses. Though observations reported by us (ibid) indicate that, *in vitro*, benomyl at low dose was the least inhibitory of seven materials and may even give some increase in growth whereas thiabendazole was much more inhibitory, the current work demonstrates that their effect on mycelial growth from treated spawn was comparable. Of the three benzimidazole type fungicides tested, carbendazim was the most inhibitory, yet it is the only material that currently has off-label approval for applications as a spawn treatment.

Table 1. Growth of *A. bisporus* after fungicide treatment of spawn grains

Treatments	Dose (mg kg^{-1})	Colony diameter (mm)
Control	0.0	36.0a*
Spawn + benomyl	50	25.6ab
Spawn + carbendazim	50	22.6b
Spawn + thiabendazole	50	25.6ab
Spawn + prochloraz	50	27.2ab
Spawn + prochloraz/carbendazim mixture	50 (36:14)	28.1ab

(*) Means followed by the same letters are not significantly different ($P = 0.05$).

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Vocabulary

agar – culture, medium, the gelatine in which bacteria or tissue can be grown

a.i. – active ingredient

mycelium – mass of threads which forms the main part of a fungus

mycelial – adjective from mycelium

spawn – (mushroom spawn) spores of the edible mushroom which are sold to be used to propagate mushroom

strain – distinct variety of species, which will breed true, usually referring to cultivated plants e.g. 'they have developed a new strain of virus-resistant rice'

Abosriwil, S.O. and J.K. Clancy. 1999. Sensitivity of *Agaricus bisporus* spawn to fungicides. *Tests of Agrochemicals and Cultivars*. 20. *Annals of Applied Biology*. 134 (Supplement): 34-35.

Quadro 1

Introdução	1	
Objectivo(s)	2	
Material e Métodos	3	
Resultados	4	
Discussão	5	

1. Read the text below. What type of publication do you think this text is taken from? Write this in the box provided. You can answer either in English or in Portuguese.

Type of publication

In all situations listed above, we could use animal tissue (e.g. liver) or whole animals (e.g. mice). Biochemists have traditionally used homogenized liver as a source of cells for enzyme or metabolic studies. So, why use animal cell culture which may require far more time in preparation and may require specialized equipment?

The major advantage of using cell culture is the consistency and reproducibility of results that can be obtained from using a batch of cells of a single type and preferably a homogeneous population (clonal). For example we may be doing a biochemical analysis where it is important to relate a particular metabolic pathway to a certain cell type. This would be possible in a culture containing a homogeneous cell population which can be monitored for biochemical and genetic characteristics, but very difficult in a tissue homogenate which would contain a heterogeneous mix of cells at different stages of growth and viability.

Toxicological testing procedures have been well established in laboratory animals. However, the use of cell culture techniques may allow a greater understanding of the effects of a particular compound on a specific cell type such as liver cells (hepatocytes). Furthermore, routine toxicity tests are far less expensive in cell culture than in whole animals.

In the production of biological products on a large scale, the avoidance of contaminants such as unwanted viruses or proteins is important. This can be performed more easily in a well-characterized cell culture than when dealing with pooled animal tissue.

The major disadvantage of the use of cell culture is that, after a period of continuous growth, cell characteristics can change and may be quite different from those originally found in the donor animal. Cells can adapt to different nutrients. This adaptation involves changes in intracellular enzyme activities. Furthermore, culturing favours the survival of fast growing cells which are selectively retained in a mixed cell population.

The changes in the growth and biochemical characteristics of a cell population may be a particular problem when using cultures to develop an understanding of the behaviour of cells *in vivo*. After a period of culture, the cells may be significantly different from those that are highly differentiated *in vivo* where growth has ceased. Some of the characteristics of cells in culture are discussed further in Chapter 2.

2. Read the sentences below. Label (see labels below) them according to what they do in the text. The first one is done for you.

A. refers to an earlier section of the text (e.g. chapter or paragraph) by restating or summarising what was written before;

B. refers explicitly to what the writer(s) says/say they are going to do next in the text (e.g. to illustrate this point let us consider….; the explanation is….).

C. refers to a later section of the text (e.g. chapter or paragraph), that is the text is being anticipated;

D. none of the above

2.1	There are three broad categories of waste: high, intermediate and low level, and these are explained in Box 13.5.	B
2.2	Figure 8.2 illustrates the type of data available on riverine inputs from UK rivers in 1990.	
2.3	(text in chapter 4) The loss of organic matter on a global scale has also been identified as a contributory factor towards global warming as the organic carbon is ultimately converted to carbon dioxide increasing the levels in the atmosphere. See also references to greenhouse effect in Chapter 3.	
2.4	This chapter describes water quality, monitoring and control procedures. It also looks at some of the important factors influencing water quality and measures taken to deal with problems. The final section looks at public drinking water supply.	
2.5	Forests and woodland occupy some 10 per cent of the land area in the UK. The Forestry Commission (FC) own or manage close to 40 per cent of these forests and woodlands and the remainder in GB are privately owned.	
2.6	Later sections cover the public water supply and metering and the average household use of water.	
2.7	Earlier chapters of this report concentrated on the condition of various environmental resources - air, water, land and wild life. They identified and discussed various areas where man's activities have created pressure on the environment.	
2.8	The following paragraphs contain information about the nature of the land in the UK, described here as land use or land cover.	

(Brown, A. (ed.) 1992. *The UK environment* Department of the Environment. HMSO London 50, 51, 61, 76, 88, 109, 191, 210.)

3. Read the texts below. Fill in each gap with an appropriate word chosen from the 4 alternatives given, as the example below demonstrates.

Example:

The plants in most tropical rain forests have never been inventoried, yet the few that remain are rapidly being cleared. Many species that inhabit these areas may be lost for ever. **For example**, a wet forest strip of coastal Ecuador was almost completely denuded of forest in the 1960s.

a) Thus b) For example c) Hence d) But

(Jones, S.B. and A.E. Luchsinger. 1987. *Plant systematics*. 2nd edn. New York: McGraw-Hill: 6.)

3.1 ________ the inventory of the earth's flora is largely complete in the northern temperate zone, much remains to be done in the tropics.

a) Consequently b) Although c) Moreover d) After

(Jones, S.B. and A.E. Luchsinger. 1987. *Plant systematics*. 2nd edn. New York: McGraw-Hill: 3.)

3.2 [Electrolytic dissociation] occurs where individual molecules of an electrolyte dissociate to give charged particles (ions). For a strong electrolyte, e.g. NaCl, dissociation is essentially complete. ________ a weak electrolyte, e.g. acetic acid, will be only partly dissociated, depending upon the pH and temperature of the solution.

a) In contrast b) As a result c) In addition d) Therefore

(Jones, A., R. Duck, R. Reed and J. Weyers. 2000. *Practical skills in environmental science*. Harlow: Prentice Hall: 23.)

3.3 To collect information in the quantitative survey, a count of insects or a measure of their presence is required. ________ of the great number and/or secretive nature of many insects, it is not feasible or even desirable to take a census by counting every individual in the population. Usually, the more efficient method is to estimate population by sampling.

a) Conversely b) Despite c) Because d) On the contrary

(Pedigo, L.P. 1999. *Entomology and pest management*. 3rd edn. Upper Saddle River, N.J.: Prentice Hall: 212.)

3.4 Glassware can be sterilized by washing with a sodium hypochlorite bleach as Chloros® or with sodium metabisulphite – dilute as recommended before use and rinse thoroughly with sterile water after use. ________, heat glassware to at least 121°C for 15 min in an autoclave or 160°C for 3 h in an oven.

a) Alternatively b) Therefore c) Furthermore d) Since

(Jones, A., R. Duck, R. Reed and J. Weyers. 2000. *Practical skills in environmental science*. Harlow: Prentice Hall: 11.)

4. Read the texts below and select the correct word from the two alternatives given. Answer in the box provided.

Example:

The simplest experiments are those in which one treatment (factor) is applied at a time to the subjects. **This analysis /This approach** is likely to give clear-cut answers but, it could be criticized for lack of realism.

(Jones, A., R. Duck, R. Reed and J. Weyers. 2000. *Practical skills in environmental science*. Harlow: Prentice Hall: 60.)

Answer: **This approach**

4.1	
4.2	
4.3	
4.4	

4.1 When species are compared, groups of species may show a number of features in common; they are then arranged into larger groupings known as genera (singular genus). **This issue, / This process**, can be repeated at each taxonomic stage to form a hierarchical system of classification whose different levels are known as taxonomic ranks.

(Jones, A., R. Duck, R. Reed and J. Weyers. 2000. *Practical skills in environmental science*. Harlow: Prentice Hall: 111-112.)

4.2 When combined with civil engineering works which provided better sewage treatment, waste disposal and cleaner water, infectious disease rates dropped substantially. **This reality / This decline** in infectious disease rates happened before the discovery and distribution of antibiotics, and public health authorities and nutritionists can take a great deal of credit for it.

(Tansey, G. and T. Worsley. 1995. *The food system: a guide*. London: Earthscan Publications: 51.)

4.3 The quantitative survey attempts to define numerically the abundance of an insect population in time and space. **Such reflection / Such information** is used to predict future population trends and to assess damage potentials.

(Pedigo, L.P. 1999. *Entomology and pest management*. 3rd edn. Upper Saddle River, N. J.: Prentice Hall: 212.)

4.4 Because different cell lines may be handled in the same laboratory, there is a danger of cross-contamination. **This problem, / This supposition**, became apparent in the 1960s when it was discovered that a variety of widely used cell lines had been exchanged between labs were contaminated with HeLa cells.

(Butler, M. 1996. *Animal cell culture and technology: the basics*. Oxford: IRL Press: 39-40.)

5. Read the expressions below and tick (✓) the expression which means the same as the given phrase.

Example:		
water quality standards	the standards for the quality of water	☑
	the quality of the standards for water	☐

5.1	coast protection policy	a) the policy for the protection of the coast	☐
		b) the protection of the policy on the coast	☐
5.2	drinking water samples	a) samples of water used for drinking	☐
		b) samples of the amount of water drunk	☐
5.3	short-term nitrogen dioxide exposure	a) to expose nitrogen dioxide for a short-term	☐
		b) to be exposed to nitrogen dioxide for a short-term	☐
5.4	organic farm wastes	a) wastes which are organic from farms	☐
		b) farms which are organic and produce waste	☐
5.5	characteristic environmental features	a) the characteristics of the features of the environment	☐
		b) the features which are characteristic of the environment	☐

(Brown, A. (ed.) 1992. *The UK environment.* Department of the Environment, HMSO: London: 17, 49, 60, 119, 123, 197.)

6. Read the definitions below. Match each definition with a word/words from the box. The first one is done for you.

abstraction	eutrophication	global warming	ionisation	radioactive decay

6.1	Removal of water from surface waters (lakes, reservoirs, rivers) and groundwater (rocks) for domestic, commercial and industrial use.	**abstraction**
6.2	The nutrient enrichment of water (especially by compounds of nitrogen and/or phosphorus), causing an accelerated growth of algae and higher forms of plant life, producing an undesirable disturbance in the balance of organisms present and reducing water quality.	
6.3	The process by which a neutral atom or molecule acquires or loses an electric charge.	
6.4	The process of transformation or disintegration of a radionuclide, resulting in the release of radiation.	
6.5	The increase in the average temperature of the earth, thought to be caused by the built up of greenhouse gases.	

(Brown, A. (ed.) 1992. *The UK environment*. Department of the Environment, HMSO: London: 243-247.)

7. Read the introduction of a research article and answer the two questions below.

Introduction

Increasing numbers of sick and injured hedgehogs (*Erinaceus europeaeus*) are being taken into captivity, to be nursed back to health and then released into the wild. Many hundreds of hedgehogs are treated in this way each year in the UK, but little has been made to find out what happens to them after release and whether their "rehabilitation" is complete or only results in disorientation and perhaps death.

.../...

(cont.)

Experiments by Morris, Munn and Crag-Wood (1991, 1993) and Morris, Meakin and Sharafi (1993) suggest that *adult* hedgehogs did survive surprisingly well after release, following a period in veterinary care. The animals integrated with their wild conspecifics, found their way about, built natural nests and showed a typical (Reeve & Morris 1985) pattern in their use. They also managed to feed adequately, although there was a long period of gradual weight loss following release.
However, these animals had the benefit of previous experience of life in the wild. Large numbers of "rehabilitated" hedgehogs are in fact juveniles that have experienced little or no independent life at all. This particularly applies to young and nestlings that have been taken into captivity in the autumn having been abandoned by their mother or because they are too small to survive the oncoming winter. Hedgehogs need to weigh at least 450 g to have sufficient fat resources to survive hibernation (Morris 1984). These rescued juveniles are normally kept active in captivity and fed well, so that they are often larger than overwintered wild hedgehogs of the same age. They are then released in the spring.
By then they may be completely adjusted to the artificial conditions of life in captivity, having known no other. They have fed from a bowl, on artificial food. They have never needed to build a nest of their own and have probably never been given the natural materials with which to do so. They have also not needed (or been able) to travel far. These animals must rely entirely on instinct to survive after release. The present study investigated the fate of a sample of these overwintered juvenile hedgehogs, after release into the wild, having had little or no previous experience of independent life.

7.1 Choose the most appropriate title for the article. Tick (✓) one box.

The effect of overwintering on juvenile hedgehogs released into the wild	
A study of rehabilitated juvenile hedgehogs after release into the wild	
The effects of captivity on the growth of juvenile hedgehogs over the winter	
A comparative study of survival rates of juvenile hedgehogs in captivity and in the wild	
A study of the rehabilitation of juvenile hedgehogs in captivity and in the wild	

7.2 Underline the sentence or sentences which helped you to choose the title.

8. Look at the pairs of sentences and tick (✓) one in which the author is less committed to what he is saying.

Example:	
Henderson (2000) suggested that milk quality was an influential factor.	☑
Miller (1999) showed that the use of fungicide X inhibited mushroom growth.	☐

8.1	According to Morrison (1999) the survey indicates that farmers promote conservation on farmland.	☐
	Day *et al.*(2000) proved that the application of this new fertilisation technique was better than the traditional fertilisation technique.	☐
8.2	Leek loss of weight by evaporation during storage was demonstrated by Morgan and Pattison (unpublished data).	☐
	Gordon (1956) believes that the practice of growing olive (*Olea europea*) plantations in Mediterranean zones dates back to Roman times or before.	☐
8.3	Ronald (2000) confirmed the results obtained by previous research (Young 1995; Lee et al. 1996).	☐
	Newman et al. (1998) attributed the drastic decrease in yield to the unusual frosty conditions in April and May.	☐
8.4	Green et al. (1998) seem to consider that this new method could be easily adopted by cattle breeders.	☐
	Watts et al. (1998) provide new evidence which confirms previous results on the application of this technique.	☐

9. Read the paragraphs below. In each paragraph one sentence has been deleted. Match the correct sentence (a - d) with each paragraph (1 - 4). The first one is done for you.

1	2	3	4
		a	

a)	In agriculture – which we use broadly to include horticulture and forestry – farmers prepare, tend and harvest animals and plants, using what knowledge they have under particular ecological, economic and cultural constraints.
b)	Agriculture is the bedrock of the food system.
c)	Land preparation makes the soil suitable to receive seeds, although today the texture and nutrient content that were produced in the past by fallows (leaving the land bare for a year or more) and leys (planting with grass or other crops that were subsequently ploughed in) are now produced with machines and fertilizers.
d)	Nowadays, fishing is the only form of hunting that still provides a significant part of our diets, but here, too, fish-farming is becoming more important.

Paragraph 1

____. In developing agriculture, humankind has modified and continues to modify the workings of the biosphere. Agricultural techniques were developed in place of hunting and gathering, to provide more managed, secure food supplies, as outlined in Chapter 3. They gave rise to many complex farming systems worldwide which, while reducing the diversity of species, still sought to operate on a cyclical basis. However, where soil or water resources were overexploited, disaster ensued.

Paragraph 2

____. Overexploitation of wild fish stocks (a resource), however, is threatening fish stocks world-wide, as more sophisticated technology, larger boats and industrial fishing enable large quantities of fish to be caught.

Paragraph 3

____. The basic cycle starts, for plants, with land preparation. This requires labour and tools. Changes in these have had a dramatic effect on what can be done – for example, the area that could be ploughed in a day increased from a fraction of a hectare to many hectares as farmers moved from human to animal power and then to tractors using fossil fuels.

Paragraph 4

____. After planting, farmers wait for the crop to grow and ripen, apart from applying occasional treatments: weeding, where manual hoeing is being replaced by herbicide spraying; fertilizer application, where animal and green manures are being replaced by artificial fertilizers; watering, if irrigation is required and feasible. When the crop is ripe, it is cut or harvested. Farmers sell or store the valuable part. The rest is left to refertilize the fields, to feed animals, or to be burned off.

10. Read the sentences below. Rank the sentences on the following scale: 1 = <u>the most certain / committed to</u> 5 = <u>the least certain</u>.

SENTENCES	RANKING
Our findings may suggest that farmers have adopted weed control practices.	
Our findings demonstrate that farmers have adopted weed control practices.	
Our findings might suggest that farmers could have adopted weed control practices.	
Our findings suggest that farmers have adopted weed control practices.	
Our findings strongly suggest that farmers have adopted weed control practices.	

11. Read the paragraphs below. Choose a correct heading for each one from the box below. The first one is done for you.

Discussion	Introduction	Material and Methods	References	Results

The structure of scientific reports is dealt with in Chapter 48. The following advice concerns methods of accumulating relevant information.

Paragraph 1: ____Introduction____

This is a big piece of writing that can be very time-consuming. Therefore, the more work you can do on it early on, the better. You should allocate some time at the start for library work (without neglecting bench work), so that you can build up a database of references (Chapter 45) While photocopying can be expensive, you will find it valuable to have copies of key reviews and references handy when writing away from the library. Discuss proposals for content and structure with your supervisor to make sure your effort is relevant. Leave space at the end for a section on aims and objectives. This is important to orientate readers (including assessors), but you may prefer to finalize the content after the results have been analysed!

Paragraph 2: ______________________

You should note as many details as possible *when doing the experiment or making observations.* Don't rely on your memory or hope that the information will still be available when you come to write up. Even if it is, chasing these details might waste valuable time.

Paragraph 3: ______________________

Show your supervisor graphed and tabulated versions of your data promptly. These can be easily produced using a spreadsheet (p. 231), but you should seek the supervisor's advice on whether the design and print quality is appropriate to be included in your thesis. You may wish to access a specialists graphics program to produce publishable-quality graphs and charts: allow some time for learning its idiosyncrasies! [...]

Paragraph 4: ______________________

Because this comes at the end of your thesis, and some parts can only be written after you have all the results in place, the temptation is to leave [it] to last. This means that it can be rushed – not a good idea because of the weight attached by assessors to your analysis of data and thoughts about future experiments. It will help greatly if you keep notes of aims, conclusions and ideas for future *as you go along.* [...]

Paragraph 5: ______________________

Because the complex formats involved (p. 244) these can be tricky to type. To save time, process them in batches as you go along.

12. In the sentences below some words are <u>highlighted</u>. Replace them with other words, making sure the meaning remains the same. Answer in the box provided.

Example: Carbon can be easily and stably exist as a neutral atom with six electrons, or it can form covalent bonds by sharing the valence electrons (usually four) of other atoms. **<u>For instance</u>**, in methane (CH_4) one carbon atom shares one electron with each of four hydrogen atoms. (Mauseth, J.D. 1995. *Botany: an introduction to plant biology*. 2nd edn. Philadelphia: Sanders College Publishing: 22.)

Answer: **<u>For example</u>**

12.1	
12.2	
12.3	

12.1 **<u>In summary</u>**, seasonal fluctuation in the amount of solar energy reaching places on Earth's surface is caused by the migrating vertical rays of the Sun and the resulting variations in Sun angle and length of daylight.

(Lutgens, F.K. and E.J. Tarbuck. 1998. *The atmosphere*. 7th edn. London: Prentice-Hall International, Inc.: 29.)

12.2 When a warm front passes, temperatures gradually rise. As you would expect, the increase is most apparent when a large contrast exists between adjacent air masses. **<u>Moreover</u>**, a wind shift from the east to the south west is generally noticeable.

(Lutgens, F.K. and E.J. Tarbuck. 1998. *The atmosphere*. 7th edn. London: Prentice-Hall International, Inc.: 209.)

12.3 Throughout this book the metric system of hectares, kilograms, metres, litres, etc., is used for measurement of areas, weights, volume and length. **<u>However</u>**, the older imperial system of acres, yards, pounds and gallons is still very much in use and so below is a list of conversion factors to use when moving from one system to the other.

(Bell, P. 1996. *Environmental farming: a guide to the Rural Environment Protection Schemes (REPS)*. Philip Farrelly & Company: ii.)

13. Write the <u>noun</u> which corresponds to the process or action described. The verbs from which the nouns are formed are given in the box below. The first two are done for you.

breed	clone	defoliate	drain	ferment	germinate	weather

13.1	Remove leaves from plants.	**defoliation**
13.2	Changing state of soil or rock through the influence of the climate (rainfall, hot sun, frost, etc.) or by chemical pollutants present in the rain or the atmosphere.	**weathering**
13.3	The action of raising a certain type of animal or plant.	
13.4	Beginning of the growth of a seed, resulting from moisture and a high enough temperature.	
13.5	Removing of water by laying drains in or under fields.	
13.6	Method of making an exact copy of a living organism by asexual reproduction, or possibly by genetic engineering.	
13.7	Process whereby carbohydrates are broken down by enzymes from yeast and produce heat and alcohol.	

(*Dictionary of agriculture*. 1990. Teddington: Peter Collin Publishing.)

Post-test 4
Texts used in questions:

1.
Butler, M. 1996. *Animal cell culture and technology: the basics*. Oxford: IRL Press: 2-3.

7.
Morris, P.A. and H. Warick. 1994. A study of rehabilitated juvenile hedgehogs after release into the wild. *Animal Welfare*. 3: 163-164.

9.
Tansey, G. and T. Worsley. 1995. *The food guide system*. London: Earthscan Publications: 16-17.

11.
Jones, A., R. Duck, R. Reed and J. Weyers. 2000. *Practical skills in environmental science*. Harlow: Prentice Hall: 67.

APPENDIX 8

Course materials (9 units)

Unit 1 - Plan
Journal articles and textbooks

I. Aims

Unit 1 aims to give an overview of text rhetorical organisation and how it may help to:
- identify topic;
- identify how the text is structured;
- identify which type of reading is appropriate (e.g. skimming for gist or careful reading);
- decide whether the text should be discarded as irrelevant to the reader's reading purpose.

II. Methodology and materials

1. Warm-up: Activities A

- Reordering and identification of the genre of two academic texts (one research article and one passage from a textbook). (S: individual)
- Answering two other questions (either in Portuguese or in English) accounting for their choices. (S: individual)

2. Lesson

- Checking the answers to Activities A (key is given). (S/T)
- Explaining briefly the concept of genre. (T)
- The unit handout and handout appendix (Table 1) will be distributed and briefly commented on. (T)
- Discussing different academic and technical genres with participants. (S/T: plenary)

Activity B:

Task 1: Nine different texts will be distributed among the participants who will work in groups of three. Bearing in mind the writer's perspective/point of view, each group will have to analyse the text in order to complete part of a table referring to the text they were allotted. Participants can use the handout appendix (Table 1) to help them complete the table. (S: groups)

Text number	Title	Genre	Audience	Purpose	Structure
1					
2 etc					

Answers will be discussed by students, who will change groups. (S: groups)

3. Follow-up: Activities C

- Reordering and identification of the genre of two academic texts (one research article and one passage from a textbook). (S: individual)
- Answering two other questions (either in Portuguese or in English) accounting for their choices. (S: individual)

4. Answering a short questionnaire (S: individual)

5. Homework

III. Schedule

1. Warm-up: Activities A (25 min.)

2. Lesson
- Explanation and discussion (15 min.)
- **Activity B** (30 min.)

3. Follow-up: Activities C (25 min.)

4. Short questionnaire (5 min.)

Unit 1 - Activities A

(25 min.)

TEXT 1A-1

1. Read the text below and answer the questions on the answer sheets provided.

Using HPP (Hydrogen Peroxide Plus) to inhibit potato sprouting during storage by U. Afek, J. Orenstein, and E. Nuriel (2000)

a.

Plant material and storage procedure

Potato tubers (cv. Desiree) were harvested from fields in Israel's northern Negev, cured for 12 days at 13 ± 1 C and 95% relative humidity (RH), and stored in three controlled environment rooms. Each room (15 x 15 x 7 m^3) contained 5 perforated ducts (70 cm in diameter) which were positioned on the floor from the plenum to the opposite wall. These ducts were covered with 750 tons of potatoes, piled 5 meters high (Brook, *et al.*, 1995). For each treatment, 5 sacks, each comprising 25 kg potatoes, were buried at random in each pile. The sacks, which had been attached to ropes to help extricate them, were removed from the piles once every five weeks, and sprout percentage were determined. This sampling process was repeated throughout the 6 month storage period for each of the three different years of storage.

Application of HPP and CIPC

On the first day after curing, the potatoes in room A received treatment with 10% HPP (sole a.i.) for 10 h. Preliminary experiments showed that this concentration of HPP most effectively inhibited sprouting. The HPP was applied with the Tabor Atomizing System, which was fitted with 3 atomizers (each with a capacity of 6 l/h). Three fans (one m diameter) forced the combination of humidified air and HPP into the bottom of the plenum; this mist reached the perforated ducts, and was then pulled up through the potato pile to the vacuum space produced above the pile (Afek and Warshavsky, 1998).

In room B, CIPC was applied to the cured potatoes in accordance with standard commercial practices (60 g CIPC/ton of potatoes) (Afek and Warshavsky, 1998). Room C was the control: the Tabor Atomizing System produced humidified air as described in room A, but no HPP was added to the water.

After the treatments, the temperature in the storage rooms was reduced to 10 ± 1 C, and the RH adjusted to 95%; these settings were maintained for 6 months. The treatments were repeated every 5 weeks for a total of four treatments.

In addition, following the first treatment, 500 tubers were sampled from each pile, and stored under the same conditions as in the source treatments; this helped evaluate the effects of a single treatment with HPP or CIPC on sprout inhibition.

a. (cont.)

Statistical analysis

The experiment was conducted during 3 years in a randomized block design and a year was considered as one replicate. Each block comprised 15 sacks that was considered as 5 sub samples of 3 sacks for each treatment each month for a total of 90 sacks.

Data were analyzed by ANOVA procedures by means of the Statistical Analysis System (SAS) package (Cary, NC, USA).

b.

Afek, U. and S. Warshavsky. 1998. Problems in storage of potatoes in Israel. *In*: Levy, D. (ed.) Potato in Hot Climate. Israel Agresearch, Journal of the Agricultural Research Organization (ARO), The Volcani Centre, Israel. Vol: 9:97-114.

Beveridge, J.L., J. Dalziel, and H.J. Duncan. 1981. The assessment of some volatile organic compounds as sprout suppressants for ware and seed potatoes. Potato Res 24:61-76.

Buitelaar, N. 1987. Sprout inhibition in ware potato storage. *In*: Rastovski, A. and A. van Es (Eds.), Storage of Potatoes: Post-harvest Behavior, Store Design, Storage Practice, Handling. Pudoc, Wageningen, The Netherlands, pp. 331-341.

Burton, W.G. 1978. The physics and physiology of storage. *In*: Harris, P.M. (ed.) The Potato Crop: The Scientific Basis for Improvement. Chapman and Hall, London, pp. 545-606.

Coleman, W. K. and S.E. Coleman. 1986. The effects of bromoethane and ethanol on potato (*Solanum tuberosum*) tuber sprouting and subsequent yield responses. Am Potato J 63:373-377.

Crossley, S.J. and R.P. Mascall. 1997. Pesticide residues – UK EC legislation, Conference Proceedings, Postharvest News and Information 8:23-26.

Edgar, A.D. 1968. Storage of potatoes. *In*: Smith, O. (ed.), Potatoes: Production, Storing, Processing. The Avi Publishing Company, Westport, Connecticut, pp. 344-358.

Es. A. van and K.J. Hartmans. 1987a. Starch and sugar during tuberization, storage and sprouting. *In*: Rastovski, A. and A. van Es (Eds.), Storage of Potatoes: Post-harvest Behavior, Store Design, Storage Practice, Handling. Pudoc, Wageningen, The Netherlands, pp. 79-113.

Es. A. van and K.J. Hartmans. 1987b. Dormancy, sprouting and sprout inhibition. *In*: Rastovski, A. and A. van Es (Eds.), Storage of Potatoes: Post-harvest Behavior, Store design, Storage Practice, Handling. Pudoc, Wageningen, The Netherlands, pp. 114-132.

Hajlova, J. and J. Davidek. 1986. Sprout inhibitors IPB and CIPC in treated potatoes. Nahrung Food 30: 75-79.

Hartmans, K.J. and A. van Es. 1979. The influence of growth regulators GA_3, ABA, kinetin and IAA on sprout and root growth and plant development using excised potato bus. Potato Res 22:319-332.

Khanbari, O.S. and A.K. Thompson. 1996. Effect of controlled atmosphere, temperature and cultivar on sprouting and processing quality of stored potatoes. Potato Res 39:523-531.

Lewis, M.D., G.E. Kleinkopf, and K.K. Shetty. 1997. Dimethylnaphthalene and diisopropylnaphthalene for potato sprout control in storage. Application methodology and efficacy. Am Potato J 74: 183-197.

b. (cont.)

Oosterhaven, K. A.C. Leitao, L.G.M. Gorris, and E.J. Smid. 1996. Comparative study on the action of S-(+)-carvone, in situ, on the potato storage fungi *Fusarium solani* var. *corruleum* and *F.sulphureum*. J Appl Bacteriology 80:535-539.

Prange, R., W. Kalt, B. Daniels-Lake, C. Liew, J. Walsh, P. Dean, and R. Coffin. 1997. Alternatives to currently used potato sprout suppressants. Conference Proceedings, Postharvest News and Information 8:37-41.

Rastovski, A. 1987. Storage losses. *In*: Rastovski, A. and A. van Es (Eds.), Storage of Potatoes: Post-harvest Behavior, Store Design, Storage Practice, Handling. Pudoc, Wageningen, The Netherlands, pp. 177-180.

Rees, T., W.L. Dixon, C.J. Pollock, and F. Franks. 1981. Low temperature sweetening of higher plants. *In*: Friend, J. and M.J.C. Rhodes (Eds.), Recent Advances in the Biochemistry of Fruits and Vegetables. Academic Press, London, pp. 41-61.

Ross, H.A. and H.V. Davies. 1992. Sucrose metabolism in tubers of potato (*Solanum tuberosum* L.): effect of sink removal and sucrose flux on sucrose-degrading enzymes. Plant Physiol 98:287-293.

Sorce, C., R. Lorenzi, and P. Ranalli. 1997. The effects of (s)-(+)-carvone treatments on seed potato tuber dormancy and sprouting. Potato Res 40:155-161.

Wang, C.Y., J.G. Buta. H.E. Moline, and H.W. Hruska. 1980. Potato sprout inhibition by camptothecin, a naturally occurring plant growth regulator. J Am Soc Hort Sci 105:120-124.

Wiltshire, J.J.J. and A.H. Cobb. 1996. A review of the physiology of potato tuber dormancy. Ann Appl Biology 129:553-569.

Yad, R.Y., R.H. Coffin, M.K. Keenan, M. Fitts, C. Dufault, and G.C. Tai. 1991. The effect of maleic hydrazide (potassium salt) on potato yield, sugar content and chip color of Kennebec and Norchip cultivars. Am Potato J 68:705-709.

c.

Potatoes (*Solanum tuberosum* L.) samples, cv. Desiree, were treated for sprout control and stored at 10 ± 1C for 6 months. Those treated four times with HPP (hydrogen peroxide plus), applied with the 'Tabor Atomizing System', had a 0% rate of sprouting. Those treated with CIPC (chloro-isopropyl N-phenyl carbamate) also had no sprouting, while the nontreated control had 84%. A single treatment with HPP or CIPC resulted, after 6 months of storage at 10 ± 1C, in sprouting rates of 61 and 58%, respectively, vs. 87% in the untreated control.

d.

Contribution from the Agricultural Research Organization, The Volcani Center, Bet Dagan, Israel. Series No. 442-1998.

e.

Sprouting is a major cause of losses in stored potatoes. Not only does sprouting reduce the number of marketable potatoes, but intensive evaporation of water from sprout surfaces also reduces the weight of the remaining tubers (Afek and Warshavsky, 1998). There are two main methods of keeping potatoes sprout free during storage: storing at low temperatures (2 to 4 C) and using sprout suppressants (Khanbari and Thompson, 1996; Prangue, *et al.*, 1997; Rastovski, 1987).

Low temperatures, however, cause the degradation of starch to sugar and increases the tubers sweetness (Es and Hartmans, 1987a; Morell and Rees, 1986; Rees *et al.*, 1981; Ross and Davies, 1992). This sweetening reduces their quality, particularly when they are intended for industrial use (Rastovski, 1987). Control atmosphere (low concentration of O_2 and high concentration of CO_2) was also found to suppress sprouting (Prangue, *et al.*, 1997). However, a high concentration of CO_2 can result in a physiological defect: blackheart (Afek and Warshavsky, 1998).

Many chemical compounds (e.g. ethylene, camptothecin, volatile monoterpenes, jasmonates, ethanol, nonanol, abscisic acid, indole-acetic acide, dichlorbenil dimethylnaphtalene and diisopropylnaphthalene) are known to inhibit sprouting. However, most of these substances have never been used commercially, or have been used only for a short time, (Beveridge, *et al.*, 1981; Coleman and Coleman, 1986; Es and Hartmans, 1987b; Hartmans and Es, 1979; Prangue, *et al.*, 1997; Wang, *et al.*, 1980; Wilshire and Cobb, 1996; Lewis, *et al.*, 1997).

The sprout inhibitors chloropropham (CIPC) and maleic hydrazide (MH) have also proved to be of value (Buitelaar, 1987; Es and Hartmans, 1987b; Hajslova and Davidek, 1986; Prangue, *et al.*, 1997; Yada, *et al.*, 1991). However, their application can be problematic. Due to environmental concerns, in several countries use of CIPC and other chemicals are either restricted or may become restricted (Afek and Warshavsky, 1998; Es and Hartmans, 1987b). MH is applied as a foliar treatment in the field 4 to 6 weeks before harvest, but its timing is delicate. If the treatment is carried out too early, the yield will be reduced, but late treatment will have an insufficient effect on sprouting (Es and Hartmans, 1987b; Yada, *et al.*, 1991). TCNB is not effective if dormancy is broken, if the store is excessively ventilated, or if the storage temperature is kept above 10 C (Es and Hartmans, 1987b).

In recent years, several studies have found carvone to be efficacious (Oosterhaven *et al.*, 1996; Scorce *et al.*, 1997; Wiltshire and Cobb, 1996). It has been registered as a sprout inhibitor and is used commercially in several countries. But because it is expensive, many countries, such as Israel, do not use it.

The present study examined HPP (G.A.T.S. Biology, P.O. Box 652 Nes Ziona 74106, Israel), a new sprout inhibitor that is based on hydrogen peroxide stabilized with a mixture of substances; it was applied with a fogger (the Tabor Atomizing System, manufactured by Plassim Industry, Kibbutz Merhavia, Israel).

f.

After 6 months of storage at 10 ± 1C, during which the potatoes received 4 treatments with HPP or CIPC, a 0% sprouting rate was found in room A (treated with HPP) and in room B (treated with CIPC); an 84% rate was found in room C (control) (Table 1). (Sprouting was considered as less than 2 mm). In the samples that were taken after the first treatment, the percentages of sprouting after 6 months at 10 ± 1C were 61, 58 and 87% from rooms A, B and C, respectively (Table 2).

Table 1. – *Sprouting of potato tubers (%) during 6 months of storage at 10 ± 1 C and 95% RH, following four treatments with HPP, CIPC or control.*

	Sprouting (%) during the storage period					
Treatment	1 month	2 months	3 months	4 months	5 months	6 months
HPP	0 a[1]	0 a	0 a	0 a	0 a	0 a
CIPC	0 a	0 a	0 a	0 a	0 a	0 a
Control	8 b	26 b	48 b	63 b	74 b	84 b

[1]Different letters within a column indicate significant differences according to Fisher's protected least significant difference test (P=0.05).

Table 2. – *Sprouting of potato tubers (%) during 6 months of storage at 10 ± 1 C and 95% RH, following four treatments with HPP, CIPC or control.*

	Sprouting (%) during the storage period					
Treatment	1 month	2 months	3 months	4 months	5 months	6 months
HPP	0 a[1]	9 a	22 a	37 a	50 a	61 a
CIPC	0 a	8 a	20 a	35 a	47 a	58 a
Control	14 b	37 b	52 b	65 b	73 b	87 b

[1]Different letters within a column indicate significant differences according to Fisher's protected least significant difference test (P=0.05).

The trend today is to minimize the use of chemicals in stored fresh produce (Crossley and Mascall, 1997), and to find alternatives to currently used potato sprout suppressants (Prangue, *et al.*, 1997). Results of the present study show that HPP applied with Tabor Atomizing System is efficacious as a sprout inhibitor (Tables 1, 2). The technology of this fogger is based on compressed air and water; it produces very small droplets that have almost no mass, carrying the HPP as a weightless gas that covers the potatoes in the storage rooms. Microscopic examination indicated that the action of HPP in inhibition of potato sprouting is by damaging the sprout tips.
Application of HPP by fogging with the Tabor Atomizing System technique is a method that is friendly to the environment, easy to implement and inexpensive.

TEXTS 1A-2

1 Now read the 6 extracts (**a** to **f**) taken from another academic text and answer the questions on the answer sheets provided.

a

accumulation *n.* The act or process of collecting together or becoming collected.

action spectrum *n.* A range of wavelengths of light within which a physiological process can take place.

alleles *n.* A particular form of gene. Alleles usually occur in pairs, one on each homologous chromosome in a diploid cell nucleus. When both alleles are the same the individual is described as being a homozygote; when each allele is different the individual is a heterozygote. The number of allelic forms of a gene can be many (multiple allelism), each form having a slightly different sequence of DNA bases but with the same overall structure. Each diploid form can carry only two alleles at one time.

allochthonous *adj.* Applied to rocks, detritus, etc., found in a place other than where they or their constituents were formed.

aposematic coloration *n.* Warning coloration in which conspicuous markings on an animal serve to discourage potential predators. Usually an aposematic animal is poisonous or unpalatable.

autecology *n.* The ecology of individual species (individuals and populations), including physiological ecology, animal behaviour and population dynamics.

autochthonous *adj.* Applied to material which originated in its present position, e.g. plant material such as peat, which actually grew where it was found rather than being brought in by outside influence, is said to be autochthonous.

bacteroid *n.* A modified bacterial cell, particularly of the type formed by species of *Rhizobium* within the root nodules of leguminous plants.

basal metabolic rate (BMR) *n.* The rate at which energy must be released metabolically in order to maintain an animal at rest. In animals, BMR is inversely proportional to body weight (i.e. small animals usually have a higher BMR than large ones).

b

C

d

7

Communities and ecosystems

Key concepts

- **A community is a dynamic and interactive collection of populations.**
- **An ecosystem comprises the biological community together with its physical environment.**
- **Communities are defined either by the habitat or by the dominant life-forms and occupy a variety of scales.**
- **Almost all populations and communities are distributed patchily.**
- **Community interactions are founded upon trophic relationships and/or predator–prey relationships.**
- **Primary and secondary productivity varies markedly between ecosystems.**
- **Changes in composition and form of community vegetation follow distinct patterns known as ecological successions, usually ending with a relatively stable climax community.**
- **Biodiversity includes habitat, species and genetic components and is under threat from human activities.**
- **Stability of communities and ecosystems is a function of three properties: persistence, constancy and resilience.**
- **Biogeographic distributions are the result of both historical (evolutionary) and ecological factors.**

The previous chapter shows how interactions at population level influence population dynamics, with population characteristics being shaped by environmental pressures, both biotic and abiotic. An ecological **community** is a dynamic collection of species populations occurring together in space and time within some common, defined habitat or environment; they are integrated or interact so as to influence other component members. The concept originated from the study of plant aggregations (phytosociology) but now applies to all organisms. Most communities include mixtures of members from most kingdoms. Groups of populations forming a community are linked together by a complex range of interactions, directly or indirectly linking all its members together in a web. This web is very much based upon competitive and predator–prey relationships but many of the linkages are very subtle or ephemeral. Examples are plants requiring animals for pollination or dispersal, and facultative or obligate mutualism, where the performance of one species is enhanced by, or dependent upon, the presence of another organism. Such is the complexity of community dynamics that our understanding of it is still fairly limited. However, its importance for the prediction of environmental impacts and for the development of environmental conservation and management programmes cannot be overstated.

The study of community ecology has largely been descriptive because of the inherent difficulty of observing, measuring and experimenting within such complex systems.

Communities are defined either by the environment or the habitat in which they occur or by the dominant species in the association, e.g. a lake community and a grassland community. Communities can be of any size, ranging from the microbial communities within the rumen of herbivorous mammals to the vast expanses of tropical rainforests. Why do the same groupings of organisms occur again and again? The answer lies with the concept of the ecological niche and the feeding relationships within the system (see Section 3.2 and Chapter 2).

7.1 Habitats and niches

Any habitat is best considered as a collection of niches. The difference between a habitat and a niche is a fundamental one for ecology. A *habitat* is the physical or geographical place where an organism lives and can itself be subdivided into *microhabitats*, small, specialised habitats containing a limited range of organisms (Figure 7.1). The carrying capacity of a particular habitat, the maximum number of supportable organisms, depends upon the availability of resources within that habitat.

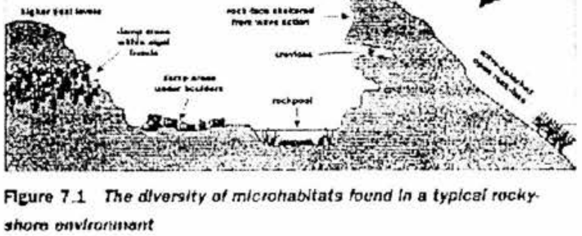


Figure 7.1 ***The diversity of microhabitats found in a typical rocky-shore environment***

A *niche*, however, is the unique position occupied by a particular species in a community. It comprises the physical, chemical, biological, spatial and temporal factors required for the survival of that species and thus determining its distribution and dynamics, i.e. its ecological role. Providing a quantitative description of a niche is both difficult and complex since it is in effect a multidimensional concept (Box 4.1).

f

Summary points

- A community is a dynamic, interactive collection of populations which occur together in space and time.
- An ecosystem comprises the biological community together with its physical environment and can be considered at a wide variety of scales.
- Communities are defined either by the habitat or by the dominant life-forms and also occupy a variety of scales from a rock pool to a rainforest.
- Almost all populations and communities are distributed patchily because conditions and resources are themselves patchy. The dynamics of competition and predator–prey interactions vary spatially and temporally.
- Community interactions are founded upon trophic relationships and/or predator–prey relationships and may be very complex and subtle.
- Primary and secondary productivity varies markedly between ecosystems, terrestrial systems providing two-thirds of all primary production but only about half of secondary production. Decomposer systems are largely unquantified but are clearly very important.
- Changes in the composition and form of community vegetation follow distinctive patterns known as ecological successions, usually ending with a relatively stable climax community. Successions can be divided into primary and secondary types.
- Biodiversity includes habitat, species and genetic components and is under threat from human activities. It is difficult to measure but is an important parameter in any ecosystem.
- Stability of communities and ecosystems is a function of three properties: persistence, constancy and resilience.
- Biogeographic distributions are the result of both historical (evolutionary) and ecological factors. Terrestrial systems are dominated by climatic factors while aquatic ones have other determinants such as water temperature, current systems, and salinity.

Discussion / Further study

1. Select an ecosystem of your choice and list/describe the niches/microhabitats that are available within it. Include non-physical aspects of the niches, e.g. feeding relationships.
2. Assess the distribution of component species within a habitat of your choice. How will you sample this habitat and what significance does the distribution and size of each species have on the method of measurement?
3. Describe the succession you might expect to observe when (a) a new gravestone is placed into a graveyard, (b) a cultivated field is left fallow for several years and (c) a 10 square metre patch of rock on a rocky shore is cleared of all life forms and then left exposed to the environment. Explain your observations and conclusions in terms of the theory of succession.
4. Obtain from the literature estimates of the total number of species predicted to exist. What assumptions have been made and why do estimates vary markedly?
5. Now think about micro-organisms and their diversity. What is a bacterial species and how many might exist? Were they included in your answer to question 4?

Further reading

Global Biodiversity Assessment. V.H. Heywood (ed.). 1995. United Nations Environment Programme, Cambridge University Press, Cambridge.
A detailed and up-to-date overview of most aspects of global diversity assessment.

Unit 1 - Activities A
Answer sheets
(20 min.)

TEXT 1A-1

1. The text you have just read has been divided into 6 parts according to its original sections. However, the original headings have been deleted.

1.1 Reorder the sections of the text. The last one is done for you.

1	2	3	4	5	6
					b

1.2 What type of academic text is it? Account briefly for your answer. You can answer either in Portuguese or in English.

1.3 Give each section a heading. The last one is done for you. You can answer either in Portuguese or in English.

1	
2	
3	
4	
5	
6	**References**

TEXT 1A-2

2. Now read the 6 extracts (a to f) taken from another academic text.

2.1 Reorder the extracts from the text. The last one is done for you.

1	2	3	4	5	6
					c

2.2 What type of academic text is it? Account briefly for your answer. You can answer either in Portuguese or in English.

2.3 Give each section a heading. The last one is done for you. You can answer either in Portuguese or in English.

1	
2	
3	
4	
5	
6	**Index**

Unit 1
Journal articles and textbooks

Aims

To give an overview of academic text organisation and how it may help you to:

- identify topic;
- identify how the text is structured;
- identify which type of reading is appropriate (e.g. skimming for gist or careful reading);
- decide whether to continue reading the text or stop.

Genre can be defined as written texts that have specific characteristics agreed upon by the conventions of the scientific community which uses that particular genre.

⇒ Examples in academic and technical writing (see Appendix 1):

- textbooks,
- proposals,
- reports (such as a lab report),
- reviews,
- research articles, etc.

This unit focuses on two genres (see Table 1 below):

- **Textbooks** (complete survey of knowledge ⇒ a way of introducing new members to the scientific community)

- **Research articles** (personal and provisional)

Table 1: Typical textbook and research article structure

Textbook	Research article[1]
Front cover	Title
Title page	Abstract
Publishing details	Introduction
Preface / introduction	Materials and Methods
Acknowledgements	Results
Contents	Discussion
Chapters	Acknowledgements
Appendices	References
References	
Glossary	
Index	
Back cover (or dust jacket blurb)	

1. This is not the only model for a research/experimental article or journal article. This model is the most common one and possibly the most studied one.

(adapted from Glendinning and Holmström 1992: 6, 12; Swales and Feak 1994a: 155.)

1. Textbook

A typical textbook chapter is divided as follows:

Table 2: Typical textbook chapter structure

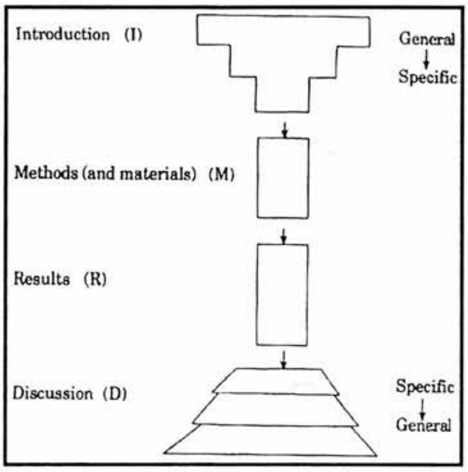
typical textbook chapter	
Title	
Introduction	G
Sections	r
1.	a
	p
	h
etc.	i
Summary	c
Further reading	s

(Glendinning and Holmström 1992: 24.)

2. Research article

Picture of a typical research article:

Figure 1: Overall shape of a research article



(Swales and Feak 1994a: 157.)

The four sections of a research article have different purposes and components:

Introduction

- provides the reasons for writing the article
- reviews the literature
- moves from a general discussion of the topic to the particular question investigated
- should attract readers

Material and methods (or methods)

- describes data, methodology, materials and procedures
- is the narrowest part of the article
- is sometimes in a smaller font

Results

- describes the findings
- has variable amounts of commentary

Discussion

- generalises the results obtained in the study
- places results in a more general context referring back to other works introduced in the first section
- suggests perspectives of further developments

Notes:

→ Sometimes the results and discussion sections are joined. It is also possible to have a separate conclusion section.

→Some journal articles do not follow any particular format, that is to say they are divided into different headings and possibly subheadings.

3. Title

Typical requirements of a good title for any genre:

- to indicate the topic of the study
- to indicate the objective of the study
- to be self-explanatory to readers in the chosen field

Further reading:

Björk, L. and C. Räisänen. 1996. *Academic writing: a university writing course*. Lund, Sweden: Studentlitteratur.

Glendinning, E.H. and B. Holmström. 1992. *Study reading*. Cambridge: Cambridge University Press.

Haarman, L., P. Leech and J. Murray. 1988. *Reading skills for the social sciences*. Oxford: Oxford University Press.

Swales, J.M. and C.B. Feak. 1994a. *Academic writing for graduate students*. Ann Arbor, Michigan: The University of Michigan Press.

Swales, J.M. and C.B. Feak. 1994b. *Academic writing for graduate students: commentary*. Ann Arbor, Michigan: The University of Michigan Press.

Weissberg, R.C. and S. Buker. 1990. *Writing up research: experimental research report writing for students of English*. Englewood Cliffs, NJ: Prentice Hall Regents.

Other references:

Ferguson, G. 1996. Genre analysis: textbook and academic journal articles. Teaching English for Specific Purposes Course. Unpublished lecture notes. University of Edinburgh.

Hyland, K. 1999. Talking to students: metadiscourse in introductory course books. *English for Specific Purposes*. 18.1: 3-26.

Hyland, K. 2000. *Disciplinary discourses: social interactions in academic writing*. Harlow: Longman.

Myers, G.A. 1992. Textbooks and the sociology of scientific knowledge. *English for Specific Purposes*. 11.1: 3-17.

Swales, J.M. 1990. *Genre analysis: English in academic research settings*. Cambridge: Cambridge University Press.

Appendix 1

Table 1: Some features of various academic and technical texts

	Genre	Writer	Audience	Purpose	Structure	
Academic texts	textbook	researcher	students (i.e. a non-specialised readers) and indirectly to peers	to instruct and present a clear and explicit introduction to or general overview of a given topic: - a broad subject/discipline or - a more specific aspect of a subject area/discipline	Front cover Title page Publishing details Preface Introduction Acknowledgements Contents Chapters 1. 2. 3.etc. Appendices Further reading and/or References Index Back cover (with blurb)	
	grant proposal or project	researcher / student	sponsors (funding authority)	to ask for funds to carry out research projects	1. Abstract 2. Introduction 3. Background (literature review) 4. Description of proposed research (methods, approaches + evaluation instruments) 5. Backup a) description of relevant institutional resources b) references c) personnel d) budget e) expected results	1.Background 2. Objectives 3. Methods 4. Itemised cost estimation 5. Evaluation of expected results
	popularization (popular article)	researcher	mixed audience (different levels of expertise)	to give a personal and accessible report on the study/experiment carried out and discuss it in the light of the present state-of-the-art	different headings and subheadings (varied, according to subject and topic)	

(cont.)

	Genre	Writer	Audience	Purpose	Structure
Academic texts	degree project report	student	supervisor/ lecturers	to obtain a university degree	Acknowledgements 1.Abstract 2. Introduction (literature review) 3. Material and methods 4. Results 5. Conclusion 6. References 7. Appendices
	research article	researcher	peers	to give a detailed report on the study/experiment carried out and discuss it in the light of the present state-of-the-art within the academic community In other words, articles: - exchange research findings - dispute theories - accumulate professional credit	Abstract Introduction Material and methods Results Discussion Acknowledgements References
	conference paper (proceedings)	researcher	peers	may report work in progress or offer a preliminary trial of new ideas; preliminary results or even results.	similar either to a written research article or to a review.
	poster (proceedings)	researcher	peers	may report work in progress or offer a preliminary trial of new ideas; preliminary results or even results but it is shorter than a conference paper	similar (but shorter than) either to a written research article or to a review.
	review (article)	researcher	peers	to synthesise the current situation in the field of research and possibly claiming that a certain line of development is more viable than others	varied, according to subject and topic

(cont.)

	Genre	Writer	Audience	Purpose	Structure
Academic texts	scientific letter	researcher	peers and wider community (i.e. researchers in other fields)	to report succinctly new results, and ideas (focus on what is currently fashionable and exciting in science)	sections may be labelled like a research article or may not be explicitly labelled in this genre
	book review	researcher	peers	to contribute to the dissemination and evaluation of research: - it offers a critical insightful perspective - it displays an awareness of the appropriate expression of praise and criticism	there usually are no sections as book reviews tend to be short
	short communication	researcher	peers	To report briefly on the study/ experiment carried out	similar (but usually shorter than) either to a research article or to a review
Technical texts	laboratory report	researcher /student	peers/ lecturer or supervisor	to describe experiment, analyse results and discuss implications	1. Description of the experimental set-up 2. Methods 3. Results 4. Discussion
	manual	researcher	mixed audience (different levels of expertise)	to give instructions on a particular topic/subject, product (e.g. software, instrument, etc.)	varied
	technical report	researcher	mixed audience[1] (different levels of expertise)	to describe, analyse results and discuss implications or a pre-article, all the research is done but needs 'polishing'; it is a fast way to publish and get a date on the research (later it can be published in a journal)	varied

1. A mixed audience could be, for example, engineers, technicians and managers.

(adapted from Haarman, Leech and Murray 1988: 29; 62; Swales 1990: 178; 183; Björk and Räisänen 1996: 310-343; Hyland 1999: 4; Hyland 2000: 41-44; 86; 98.)

Unit 1 - Activity B
Journal articles and textbooks

Texts used:

Text 1

Timbrell, J. 2000. *Principles of biochemical toxicology*. 3rd edn. London: Taylor and Francis.

Text 2

Holmes, C.W., H. Kamote, D.D.S. Mackenzie and P.C.H. Morel. 1996. Effects of a decrease in milk yield, caused by once-daily milking or by restricted feeding, on the somatic cell count in milk from cows with or without subclinical mastitis. *The Australian Journal of Dairy Technology*. 51. April: 8-11.

Text 3a

Tiley, G.E.D. and B. Philp. 2000. Effects of cutting flowering stems of Giant Hogweed *Heracleum mantegazzianum* on reproductive performance. *Aspects of Applied Biology 58, Vegetation management in changing landscapes*: 77-80.

Text 3b

Goodman, A. 2000. 'Designing out' future problems when creating urban woodland. *Aspects of Applied Biology 58, Vegetation management in changing landscapes*: 87-92.

Text 4

Barrow, P.A. and J.S. Soothill. 1997. Bacteriphage therapy and prophylaxis: rediscovery and renewed assessment of potential. *Trends in Microbiology*. 5.7: 269-271.

Text 5

Walter, K.S., E.J. Fricker and C.R. Fricker. 1994. Observations on the use of a medium detecting ß-glucuronidase activity and lactose fermentation for the simultaneous detection of *Escherichia coli* and coliforms. *Letters in Applied Microbiology*. 19: 47-49.

Text 6

Walker, A.K. and T.K. Crosby. 1988. *The preparation and curation of insects*. Wellington, New Zealand: Science Information Publishing Centre: 8-19.

Text 7

Glenn, E.P., J.J. Brown and J.W. O'Leary. 1998. Irrigating crops with seawater. *Scientific American*. August: 56-61.

Text 8

Humphrey, J.W. 2000. Book review: Forest ecosystem analysis at multiple scales. *Journal of Applied Ecology*. 37: 697.

Text 9

Lawson, M.J. and A.A. Keeling. 1999. Production and physical characteristics of composted poultry carcases. *British Poultry Science*. 40: 706-708

Unit 1 - Activities C

(25 min.)

Text 1C-1

1. Read the 6 extracts (**a** to **f**) taken from an academic text and answer the questions on the answer sheets provided.

TEXT 1C-2

2. Read the text below and answer the questions on the answer sheets provided.

Effect of different types of litter for rearing broilers by B. K. Swain and R. N. S. Sundaram (2000)

a.

ANISUZZAMAN, M. & CHOWDHURY, S.D. (1996) Use of four types of litter for rearing broilers. *British Poultry Science*, **37**: 541-545.

ANON (1992) Effect of litter on broilers. *Poultry International*, p. 40.

DUNCAN, D.B. (1955) New multiple range and multiple F test. *Biometrics* , **11**: 1-42.

EURIBRID, B.V. (1994) *Euribrid Technical Information for Hybro Broilers.* Euribrid Poultry Breeding Farms. Boxmeer, The Netherlands.

HAQUE, M.I. & CHOWDHURY, S.D. (1994) Use of rice husk litter at different depths for broiler chicks during summer. *British Poultry Science*, **35**: 809-813.

NORTH, M.O. (1981) *Commercial Chicken Production Manual*, pp. 211-212. (West Port, CT, AVI Publishing Co).

OLIVEIRA, S.C., CAVLHEIRO, A.C.L., TRINDADE, D.S., LOPEZ, J., & CORREA-OLIVEIRA, S. (1974) Comparison between types of litter in broiler production in Rio Grande do Sul Brasil. *Proceedings and Abstracts of the 15th World's Poultry Congress*, pp. 342-344 (Washington, USA, World's Poultry Science Association).

POPOLIZIO, E.R., RICCI, H.R., CASTELLOTE, H.F. & PAILHE, L.A. (1979) Use of different materials for poultry litter. *Agronomica Zootecnica*, **75**: 14.

SHANMUGHASUNDARAM, S., THIAGARAJAN, M., VENKATASUBRAMNYAN, S. & MICHEL, R.D. (1977) A study of sanitary qualities of different poultry house litter materials and its influence on broiler performance. *Poultry Abstracts*, **3**: 183.

SNEDECOR, G.W. & COCHRAN, W.G. (1980) *Statistical Methods.* 6th edn., pp, 299-569. (Calcutta, Oxford and IBH Publishing Co.).

b.

The performance is shown in the Table. Type of litter did not affect the weight gain ($P \leq 0.05$), a finding consistent with earlier observations (Oliveira *et al.*, 1974; Shanmughasundaram *et al.*, 1977; Anisuzzaman and Chowdhury, 1996). The body weight gain, food consumption, efficiency of food utilization and survivability of broilers maintained on coir dust did not differ significantly ($P \leq 0.05$) from those kept on the other litter materials. Two birds died on each of the 3 litter materials, in each of 2 pens. The moisture content of different litter materials differed significantly ($P \leq 0.05$) as shown in the Table. Both coir dust and rice husk were good adsorbants compared to saw dust. The ability to release moisture was greatest for rice husk followed by coir dust and then saw dust because rice husk showed the lowest incidence of soiled plumage followed by coir dust (2nd) and saw dust had the highest incidence even though rice husk contain more moisture than saw dust. There was no evidence of breast blisters in birds grown on any of the litter materials.

The Table also shows litter cost/bird based on current market price with different kinds of litter materials. Rice husk litter was most expensive and coir dust was the cheapest of all materials used. Results on production variables support the use of coir dust. The production results and production number for coir dust were comparable to those of saw dust and rice husks. This study suggests that coir dust is an acceptable floor litter material for raising broilers. It can be concluded that coir dust, which is an agrowaste with little commercial value, could be used as a sustainable litter material for raising broilers in tropical coastal regions.

Table 1. – *Performance of broiler chicks on different types of litter from 1 to 42 d (± SEM).*

	Rice husk	Saw dust	Coir dust
Weight gain (g/bird)	1071±24-9	1086±20-2	1050±13-6
Food consumption (g/bird)	2626±43-4	2789±64-5	2711±56-7
Food conversion (g food/g gain)	2.50±0-03	2.57±0-09	2-58±0-04
Production number (PN)	95.91±3-9	96.54±5-4	95-91±3-9
Litter moisture (%)	38.02±0-16^{b}	31.03±0-73^{c}	42-88±0-45^{a}
Litter cost/broiler produced (Rs)	2-22	1-78	0-89

^{abc} Difference between mean values in a row are significant ($P \leq 0.05$)

c.

We are thankful to Dr. D.G. Dhandar, Director, ICAR Research Complex for Goa, Ela, Old Goa for providing the necessary facilities required for conducting this study.

d.

Three groups each with 45 1-d-old broiler chicks were reared for 42 d [days] on cement floors with one side brick wall and other sides covered with wire mesh, using rice husk, saw dust and coir dust as litter material during the months of June and July. The litter materials were sun dried on receipt from their source. Each material was spread to a depth of 50 mm and evaluated in 3 replicate pens of 15 birds. Each pen provided a floor space of $0.09m^2$/chick. Birds were allocated to the different pens at random. All the pens were clean, had been disinfected and left for a period of 3 weeks before the start of the experiment. A broiler diet containing 230 g crude protein, 12.35 MJ/Kg ME, 10 g calcium and 5 g available phosphorus per kg was fed *ad libitum* as mash. This diet was prepared using locally available food ingredients. Water was available at all times. Commercially available plastic circular feeders and waterers were used. The chicks were brooded until 3 weeks of age. Brooding was done in individual pens using specially designed indigenous bamboo baskets fitted with 60 watt bulb. When the additional heat was withdrawn, the ambient temperature ranged from 28° to 30.5°C. The experiment was conducted from 1 d to 42 d of age. All the birds were immunized against Newcastle Disease and fowl pox following procedure recommended by the vaccine manufacturers.

During the later part of the experiment, samples were collected from 3 different locations in each of the 9 pens (near a feeder, near the brooder and near a wall) and a composite sample was prepared for each. Duplicate samples from each of the groups were weighed and dried overnight at 105° C in an electric oven to determine the moisture content. The incidence of soiled plumage and breast blisters was measured by visual assessment of soiling of body feathers and feather shedding from the region of the breast (as a result of contact with litter), respectively.

Weekly body weight gain, food consumption and mortality were recorded, food conversion efficiency was determined and the efficiency of performance was evaluated in terms of production number (PN) as follows (Euribrid, 1994):

$$PN = \frac{\text{abw x \% liv.}}{\text{Days x fc/10}}$$

Where, abw = average body gain; liv.= per cent livability; days = duration of fattening in days; fc = food conversion.

The data were subjected to statistical analysis according to Snedecor and Cochran (1980) and means were tested for significance by the multiple range test (Duncan, 1955).

e.

Commercial broiler production has gained wide popularity recently in many countries particularly in South-East Asia which includes countries like India, Pakistan and Bangladesh. The importance of good quality litter for rearing broilers on floor has been well recognised. A wide variety of litter materials have been considered for raising broilers such as saw dust, paddy straw, sand, rice husk, sugar cane pulp, oat hulls, corn cobs and peat moss. Oliveira *et al.* (1974) observed that type of litter had no significant effect on growth rate, food conversion, mortality and performance index but reported a higher incidence of breast blisters in birds reared on sand in contrast to those reared on wood shavings and rice husk. Anisuzzaman and Chowdhury (1996) compared 4 types of litter, viz. rice husk, saw dust, paddy straw and sand, and found that rice husk was the best litter material for rearing broilers with better growth, food consumption and food conversion. Similar reports have also been obtained by Popolizio *et al.* (1979) whereas a recent study indicated that neither type of litter nor their depth significantly affected bird performance (Anonymous 1992). Haque and Chowdhury (1994) reported that rice husk can be suitably used as litter material at depths between 20 and 50 mm without affecting production characteristics and health of broilers.

Work conducted in different countries has indicated that locally available materials are usually preferred as litter for poultry birds. The ideal litter should be economical, durable, contain little moisture and should not be readily caked (North, 1981). No attempt has been made to evaluate locally available cheap material such as coir dust, an agrowaste product from the coir industry in South-East Asian countries. This material is presently used as fertilizer to a limited extent. Surplus supplies are plentiful near centres of the coir industry, so it could be used as a bedding material for rearing broilers on the floor. The present study was therefore undertaken to compare the production performance of commercial broiler chickens reared on conventional litter material like sawdust and rice husk with their performance on locally available coir dust in a conventional floor system.

f.

1. Coir dust was evaluated as broiler litter in comparison with sawdust and rice husk using 135 commercial broilers. Forty-five broiler chicks were reared to 42 d on a 50 mm layer of each of these litters.
2. Birds reared on coir dust showed no difference in food consumption, body weight gain, food conversion efficiency, production number and survivability in comparison to those reared on saw dust and rice husk.
3. It was concluded that coir dust is suitable as broiler litter when cheaply available.

a

5: Forests: Timber Production

Questions

- Can timber be produced at an adequate rate in a way that is sustainable long-term?
- Before human interference, were all forests mixed-age, regenerating by small gaps, or were large areas even-aged?
- Should forests be harvested by selecting individual trees, to create small gaps for regeneration? If, instead, areas are clear-felled, does the size of the felled area matter?
- Would it be better to grow all the timber we need in single-species plantations, not relying at all on existing mixed-species forests?
- After clear-felling, can we rely on natural regeneration, or should we expect to replant? Will natural regeneration happen fast enough and will it have the right species composition? If not, what can we do about it?
- Can timber be grown and harvested long-term with only natural nutrient inputs? Are there any ways, apart from adding fertilizers, that we can improve the nutrient status of forests?

Background science

- Amounts of wood used per year, worldwide.
- Rates of wood production by present forests.
- Present amount of forested area, and how it is changing.
- Tree population dynamics. Mortality. Regeneration in relation to gaps. Even-aged and mixed-age forests.
- Fires in forest: their frequency in the past, and their effects on the forests.
- Systems of forest management, i.e. of felling and regeneration.
- Yields of plantations. Importance of rotation length.
- Nutrient balance of forests. Losses at harvest.
- Trees with nitrogen-fixing symbioses. Mycorrhizas.

Forests have many functions. They provide wood that can be used for making things or for fuel; they provide fruits, tanning materials, latex and other useful products; domestic animals can be grazed in them, wild animals hunted; they influence soil erosion rates and water run-off to rivers and lakes; they provide areas for recreation; they alter the appearance of the landscape. In this chapter I concentrate on just one of these, forests as producers of wood. Forests as the habitat of wild plants and animals is a major topic of Chapter 8, on Conservation.

Production of timber and food can be seen as interacting land uses. Large parts of the world's angiosperm forests have in the past been used for shifting cultivation, which is effectively a mixture of farming and forestry. The forest fallow, as well as being a way of returning the patch to suitable conditions for another cropping period, provided the villagers with timber and other forest products. *Agroforestry*, which is today practised extensively in the tropics and a little in temperate regions, has some of the same features. Trees are planted widely spaced, with crops or grazing land between. As the trees grow larger, crop growth or grazing is reduced and finally abandoned. A further development is *alley cropping*, in which parallel rows of trees and crops are grown. The trees are cut back frequently, so allowing crop growth to continue for many years. Although I say no more about these ways of growing trees, we should bear in mind that there are viable systems of land use where timber is only one of the useful products. For further information on agroforestry see Nair (1989).

Sustainable production of wood

The key questions for this chapter are: can the world's population obtain the wood it needs on a sustainable basis? and if so, how is this best done? Sustainable wood production means that, at least when viewed over a large area, wood can continue to be extracted at the same rate year after year, and the forests can continue to grow and produce wood at the same rate for the future. This requires that after trees are harvested new trees replace them, and by having trees of different ages growing up, there are always some approaching a suitable age for felling. This is not a new idea. The Romans had management systems for forests that probably succeeded in achieving sustainable production. There have been continuous traditions of sustainable forestry in parts of Europe since the Middle Ages, e.g. in parts of Germany (Heske 1938). But in other parts of the world at other times standing forests have been treated as a non-renewable resource: people or organizations have extracted timber and then moved on. Williams (1989) provides maps which show graphically how timber felling moved across the United States: during the early part of the 19th century it was concentrated in the northeast, but as those forests became worked out it spread to the Lake States, the southeast, and by the early 20th century to the Pacific Northwest. Clear-felling as a one-off activity happened in other countries, too, for example in Australia. In tropical regions there has been widespread selective removal of particular tree (cont.) **a**

(...)

it could not do when non-mycorrhizal (Abuzinadah *et al.* 1986). These results suggest that in the field some mycorrhizal fungi (but not others) enable their associated trees to obtain N from organic N sources in litter without depending on free-living decomposer organisms, which could put them at an advantage where decomposition rates are slow. So further research on mycorrhizas may open up opportunities to alter the mycorrhizal species composition in forests in ways that would benefit the trees' mineral nutrition.

Conclusions

- The present tree trunk growth of the world's forests is greater than the amount of timber harvested. This suggests that it should be possible for the world's timber requirements to be obtained in a sustainable way.
- The total forest area is decreasing in many tropical countries, but in many of the major timber-producing countries of the north temperate zone it is not.
- In the coniferous forest area of North America fires have been frequent enough in the past to result in much of the forest being even-aged patches. In contrast, much temperate deciduous and tropical forest was, before farming, disturbed infrequently enough for it to be mixed-age.
- Selective removal of individual large trees can work well in some temperate forests. Whether it can be a satisfactory method long-term in tropical forests is doubtful.
- After clear-felling natural regeneration is often rapid. However, the species that predominate in early regeneration may not be the most desirable for timber.
- Under some circumstances input of N in rain can be sufficient to balance removal in trees at harvest, provided only the trunks are removed. However, clear-felling can increase N loss by leaching.

Further reading

Forest ecology:
  Temperate: Waring & Schlesinger (1985)
  Tropical: Whitmore (1984)

Forest nutrition:
  Bowen & Nambiar (1984)

History—people and forests in the past:
  U.S.A.: Williams (1989)
  U.K.: Rackham (1976)
  Germany: Heske (1938)

(cont.) **a**

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Management and exploitation of tropical forest:
Eden (1990)
Gomez-Pompa *et al.* (1991)

Plantation forestry:
Temperate: Savill & Evans (1986)
Tropical: Evans (1992)

Economics of forestry:
Price (1989)

b

C

Some of the titles have been abbreviated. These are indicated by [ ].

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d

This has several functions.:

1 It gives the meaning of specialist terms and abbreviations used in the book.

2 If a species has been called by its English name in the text, the Latin (scientific) name is given here. A few of these may be out of date, if the name has been changed.

3 If a species was called only by its Latin name in the text, an English name is given here, or else some indication of what major group it belongs to.

Acer rubrum = red maple.

Aggregate (soil crumb) Formed by numerous soil mineral particles (e.g. individual clay particles) bound together, though with pores between them able to hold water.

Agropyron Grasses, some of them tussocky (bunchgrass). *Agropyron spicatum* has been renamed *Pseudoroegneria spicata*.

Agrostis = bentgrasses. *Agrostis vinealis* was formerly called *Agrostis canina*.

Alder = *Alnus*.

Alfalfa = lucerne = *Medicago sativa*.

Anchoveta, Peruvian = *Engraulis ringens*.

Anemone, wood = *Anemone nemorosa*.

Artemia = brine shrimp. In the Anostraca (fairy shrimp) group of Crustacea.

Ash = *Fraxinus*.

Auk, little = *Plotus alle*.

Autotroph An organism that does not obtain its energy from organic matter, but by photosynthesis (photoautotroph) or by oxidizing inorganic materials.

Balsa = *Ochroma lagopus*.

Bear = *Ursus*; grizzly bear = *Ursus arctos*.

Beech = *Fagus*.

Benthic Species that live within the bottom deposit of a lake or sea, or on the surface of the deposit.

Billion In this book means thousand million (10^9).

Birch = *Betula*.

Bluebell = *Hyacinthoides non-scripta*.

Blueberry = *Vaccinium angustifolium*.

Bluejay = *Cyanocitta cristata*.

Boar, wild = *Sus scrofa*.

Bobcat = *Lynx rufus*.

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Unit 1 - Activities C
Answer sheets
(20 min.)

Text 1C-1

1. Read the 6 extracts (**a** to **f**) taken from an academic text.

1.1 Reorder the extracts from the text. The last one is done for you.

1	2	3	4	5	6
					f

1.2 What type of academic text is it? Account briefly for your answer. You can answer either in Portuguese or in English.

1.3 Give each section a heading. The last one is done for you. You can answer either in Portuguese or in English.

1	
2	
3	
4	
5	
6	**Index**

TEXT 1C-2

2. The text you have just read has been divided into 6 parts according to its original sections. However, the original headings have been deleted.

2.1 Reorder the sections of the text. The last one is done for you.

1	2	3	4	5	6
					a

2.2 What type of academic text is it? Account briefly for your answer. You can answer either in Portuguese or in English.

2.3 Give each section a heading. The last one is done for you. You can answer either in Portuguese or in English.

1	
2	
3	
4	
5	
6	**References**

Activities A
Texts used in questions:

1.1, 1.2 and 1.3

Afek, U., J. Orenstein and E. Nuriel. 2000. Using HPP (Hydrogen Peroxide Plus) to inhibit potato sprouting during storage. *American Journal of Potato Research.* 77.1: 63-65.

2.1, 2.2 and 2.3

Jones, A.M. 1997. *Environmental biology*. London: Routledge: 162; 163; 180-181, 183; 191.

Activities C
Texts used in questions:

1.1, 1.2 and 1.3

Newman, E.I. 1993. *Applied ecology*. Oxford: Blackwell Science: 113-114; 146; 291; 297; 319.

2.1, 2.2 and 2.3

Swain, B.K. and R.N.S. Sundaram. 2000. Effect of different types of litter material for rearing broilers. *British Poultry Science*. 41.3: 261-262.

Unit 2 - Plan
Reviews, previews and action markers

I. Aims

Unit 2 will focus on three types of metatext:

a) reviews (explicit indicators that an earlier section of the text is being restated or summarised);
b) previews (explicit indicators that a later section of the text is being anticipated);
c) action markers (indicators of discourse acts performed in the text).

The presence of these metatextual elements, or text about the text, may range from single words to sequences of sentences. They reflect the writer's rhetorical preferences for a reader-oriented attitude, which may facilitate reading. That is, the writer tends to be more explicitly present in the text either by commenting on the text rhetorical organisation or its propositional content (Valero-Garcés 1996; Mauranen 1993).

II. Methodology and materials

1. **Warm-up: Activity A**

- Identifying previews, reviews and action markers in a passage from a textbook. (S: individual)

2. Lesson

- Checking the answers to Activity A (key is given). (S/T)
- The unit handout will be distributed and briefly commented on: explaining how a text can be reader-oriented and how the writer may achieve this purpose. (T)
- Labelling examples of metatext given in the handout. (S: individual)

Activities B:

Task 1: Grouping of underlined clauses and sentences in a passage taken from a textbook in a table according to their purpose/function. (S/T: plenary)

Task 2: Identifying reviews, previews and action markers in the academic text brought by each participant. In case they did not bring one, a text will be supplied[1]. (S: individual or pairs)

Task 3: Filling in gaps with previews, reviews and action markers given in a table. (S: pairs)

3. Follow-up: Activity C

- Identifying previews, reviews and action markers in a passage from a textbook. (S: individual)

4. Answering a short questionnaire (S: individual)

5. Homework

III. Schedule

1. Warm-up: Activity A (20 min.)

2. Lesson
- Explanation and discussion (15 min.)
- **Activities B**:
  Task 1. (15 min.)
  Task 2. (10 min.)
  Task 3. (15 min.)

3. Follow-up: Activity C (20 min.)

4. Short questionnaire (5 min.)

---

[1] Turner, J. and M. Taylor. 1998. *Applied farm management*. 2nd edn. Oxford: Blackwell Science: 1-9.

Unit 2 –Activity A

(20 min.)

TEXT 2A-1

Read the following passage taken from a textbook. Underline and label (E, L or S) the clauses or sentences in which the writers are trying to help the reader to follow the text by:

E - referring to an earlier section of the text (e.g. chapter or paragraph) by restating or summarising what was written before;

L - referring to a later section of the text (e.g. chapter or paragraph), that is, the text is being anticipated;

S - referring explicitly to what the writers say they are going to do next in the text (e.g. to illustrate this point let us consider….; the explanation is….).

The first one is done for you: the underlined sentence is labelled S

Chapter - 6 Air Pressure and Winds

Of the various elements of weather and climate, changes in air pressure are the least noticeable. In listening to a weather report, generally, we are interested in moisture conditions (humidity and precipitation), temperature, and perhaps wind. It is rare the person, however, who wonders about air pressure. Although the hour-to-hour and day-to-day variations in air pressure are not perceptible to human beings, they are very important in producing changes in our weather. For example, it is variation in air pressure from place to place that generates winds that in turn can bring changes in temperature and humidity (Fig. 6-1). Air pressure is one of the basic weather elements and a significant factor in weather forecasting. As we shall see, air pressure is closely tied to the other elements of weather (temperature, moisture, and wind) in a cause-and-effect relationship.

Air Pressure

In Chapter 1, we noted that **air pressure** is simply the pressure exerted by the weight of air above. Average air pressure at sea level is about 1 kilogram per square centimeter, or 4.7 pounds per square inch. This is roughly the same pressure that is produced by a column of water 10 meters (33 feet) in height. With some simple arithmetic, you can calculate that the air pressure exerted on the top of a small (50 centimeter by 100 centimeter) student desk exceeds 5000 kilograms (11,000 pounds), or about the weight of a 50-passenger school bus. Why doesn't the desk collapse under the weight of the ocean of air above? Simply, air pressure is exerted in all directions, down, up, and sideways. Thus, the air pressure pushing up on the desk.

You might be able to visualize this phenomenon better if you imagine an aquarium that has the same dimensions as the desk top. When this aquarium is filled to a height of 10 meters

…/…

(cont.)

(33 feet), the water pressure at the bottom equals 1 atmosphere (14.7 pounds per square inch). Now, imagine what will happen if this aquarium is placed at the top of our student desk so that all the force is directed downward. Compare this to what results when the desk is placed inside the aquarium and allowed to sink to the bottom. In the latter situation, the desk survives because the water pressure is exerted in all directions, not just downward as in our earlier example. The desk, like your body, is 'built' to withstand the pressure of 1 atmosphere (14.7 pounds per square inch). It is important to note that although we do not generally notice the pressure exerted by the ocean of air around us, except when ascending or descending in an elevator or airplane, it is nonetheless substantial. The pressurized suits used by astronauts on space walks are designed to duplicate the atmospheric pressure experienced at Earth's surface. Without these protective suits to keep body fluids from boiling away, astronauts would perish in minutes.

Factors Affecting Air Pressure

The concept of air pressure can be better understood if we examine the behavior of gases. Gas molecules, unlike those of the liquid and solid phases, are not 'bound' to one another but are freely moving about, filling all space available to them. When two gas molecules collide, which happens frequently under normal atmospheric conditions, they bounce off each other like very elastic balls. If a gas is confined to a container, this motion is restricted by its sides, much like the walls of a handball court redirect the motion of the handball. The continuous bombardment of gas molecules against the sides of the container exerts an outward push that we call air pressure. Although the atmosphere is without walls, it is confined from below by Earth's surface and effectively from above because the force of gravity prevents its escape. Here we define *air pressure* as the force exerted against a surface by the continuous collision of gas molecules.

[...]

In summary, air pressure is the force exerted against a surface by the continuous collision of gas molecules. Both the temperature and the density of the gas determine the pressure a gas will exert. However, what appears to be a simple matter is complicated by the fact that a change in either of these variables (temperature or density) affects the other. In a closed container where density remains constant, an increase in temperature results in an increase in gas pressure. In the atmosphere, however, a decrease in temperature results in an increase in density, which usually causes an increase in air pressure. Thus, because cold air masses are denser than warm air masses, they are generally associated with higher atmospheric pressure.

Pressure Changes With Altitude

Let us consider the decrease in pressure with altitude mentioned in Chapter 1. The relationship between air pressure and density largely explain this observed decrease. To illustrate, imagine a cylinder fitted with a movable piston, as shown in Figure 6-2. If the temperature is kept constant and weight are added to the piston, the downward force exerted by gravity will squeeze (compress) the gas molecules together. The result is to increase the density of the gas and hence the number of gas molecules (per unit area) bombarding the cylinder wall as well as the bottom of the piston. Therefore, an increase in density results in an increase in pressure.

.../...

(cont.)

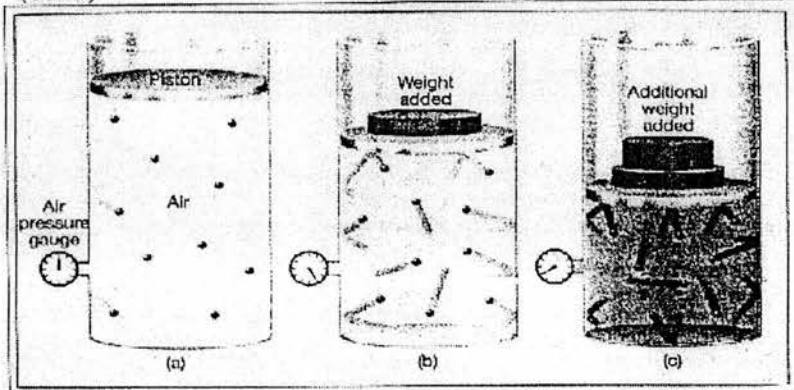

Figure 6–2 Schematic drawing showing the relationship between air pressure and density. Cylinder (a) of air fitted with movable piston. As more weight is added (b and c) to the piston, the increased number of molecules per unit volume (density) causes an increase in the pressure exerted on the walls of the cylinder and the gauge.

Table 6–1 U.S. standard atmosphere

HEIGHT (KM)	PRESSURE (MB)	TEMPERATURE (°C)
50.0	0.798	−2
40.0	2.87	−22
35.0	5.75	−36
30.0	11.97	−46
25.0	25.49	−51
20.0	55.29	−56
18.0	75.65	−56
16.0	103.5	−56
14.0	141.7	−56
12.0	194.0	−56
10.0	265.0	−50
9.0	308.0	−43
8.0	356.5	−37
7.0	411.0	−30
6.0	472.2	−24
5.0	540.4	−17
4.0	616.6	−11
3.5	657.8	−8
3.0	701.2	−4
2.5	746.9	−1
2.0	795.0	2
1.5	845.6	5
1.0	898.8	9
0.5	954.6	12
0	1013.2	15

The piston will continue to compress the air molecules until the downward force is balanced by the ever increasing gas pressure. If more weight is added to the piston, the air will compress further until the pressure of the gas once again balances the new weight of the piston.

Similarly, *the pressure of any given altitude in the atmosphere is equal to the weight of the air directly above that point.* Recall that at sea level, a column of air weighs slightly more than 1 kilogram per square centimeter and therefore exerts that amount of pressure. As we ascend through the atmosphere, we find that the air becomes less dense because of the lesser amount (weight) of air above, and as would be expected, the result is a corresponding decrease in pressure.

Recall in Chapter 1 that the rate at which pressure decreases with altitude is not constant. The rate of decrease is much greater near Earth's surface, where pressure is high, than aloft, where air pressure is low. The 'normal' decrease in pressure experienced in increased altitude is provided by the standard atmosphere in Table 6-1. The **standard atmosphere** depicts the idealized vertical distribution of atmospheric pressure (as well as temperature density, which is taken to represent average conditions in the real kilometers, it is one-fourth; at 15 kilometers, it is one-eighth; and so forth. Thus, at the altitude at which commercial jets fly (10 kilometers), the air exerts a pressure equal to only one-fourth that at sea level.

(Lutgens, F.K. and Tarbuck, E.J. 1998. *The atmosphere*. 7th edn. London: Prentice-Hall International, Inc: 136-138.)

Unit 2
Reviews, previews and action markers

Aims

To focus on parts of the text which help you to better understand the text by:

a) summarising or referring back to previous sentences or sections of the text;
b) anticipating what is coming next in the text;
c) explaining what the writer is doing in a section of the text.

1. Reader/writer relationship

When we talk face to face there is a relationship between the participants in the dialogue and the same thing happens in writing. Therefore, the writer has to adapt to his/her readers taking into account their expectations, interests, reactions, problems in understanding the information conveyed in the text (i.e. processing problems) and background knowledge of the topic.

Compared to academics with different cultural backgrounds (such as Spanish, Czech, Finnish, or German) some studies indicate that Anglo-American writers tend to:

- have a more explicit presence in the text;
- use more 'metatext' (see definition below);
- have a more reader-oriented attitude.

Their texts tend to:

- show more transparency of aims;
- a more linear progression of discourse;
- and more simple wording.

Aims of metatext:

- make a text more friendly and considerate to readers' needs and feelings;
- make the writer-responsible language, i.e. it is the writer (and not the reader) who is primarily responsible for effective communication;
- give more information and guidance which is an expression of politeness in English.

2. Metatext

Metatext: text which 'talks' about the text itself, allowing the writer to be present in the text in a more explicit way.

Types of metatext:

1. text which helps clarify the organisation of the text, what is being said/written;

2. text which makes clear the feelings or attitudes towards the content of the text and interacts with the reader.

3. Metatextual elements

Here we only consider the textual function through three types of metatextual elements:

1. **Reviews or earlier markers** – words, expressions or phrases and sometimes clauses or abbreviated clauses that contain an explicit indication that an earlier stage of the text is being repeated or summarised.

e.g. *So far we have assumed that...*
As previously mentioned...
However, the above argument...
The results in the previous section show that...

2. **Previews or later markers** - words, expressions, phrases and sometimes clauses or abbreviated clauses that contain an explicit indication that a later stage of the text is being anticipated or summarised.

e.g. *We show below that...*
To show this, we redevelop the argument in this section using....
We first characterise....and then investigate...
As we shall see in Chapter 6...
In the following section, we will consider...

3. **Action markers** - words or phrases that refer explicitly to what the writer(s) says/say they are going to do next in the text.

e.g. *The explanation is...*
To illustrate this...
For the purpose of illustration...
To give an example...
To express this argument...

(adapted from Crismore and Farnsworth 1990: 122-123; Valero-Garcés 1996: 284; Moreno 1997: 163; Mauranen 1993: 9-13.)

Note:

→ The same sentence may include both a review and a preview:

[text from chapter 6] '**Thus, grazing management systems range from attempts to optimize the interaction between grassland and animals given an understanding of grass growth (Chapters 3-5), grass quality, animal intake and animal requirements (Chapter 7) to systems that attempt to sustain livelihoods in the long term (Chapter 9)**.'

(Pearson, C.J. and R.L. Ison. 1997. *Agronomy of grassland systems*. Cambridge: Cambridge University Press: 140.)

→ The same sentence may include both a preview and an action marker:

'**This paper describes** the methodology for site based Habitat Restoration Monitoring (HRM) developed in the trial areas in 1998/99.'

(Mitchley, J., F.M. Burch, G.P. Buckley and T.A. Watt. 2000. A methodology for monitoring habitat restoration target in agricultural landscapes in lowland England. *Aspects of Applied Biology 58, Vegetation management in changing landscapes*: 279.)

4. Examples

Label each group of examples below according to the type of metatext they exemplify:

Textbooks:

- ________________

'Much has been written on the works and life of Linnaeus, and **more information may be found in references cited at the end of this chapter** (Blunt, 1971; Daniels et al., 1976; Frängsmyr, 1983; Fries, 1923; Stafleu, 1971, Stearn, 1957).'

(Jones, S.B. and A.E. Luchsinger. 1987. *Plant systematics*. 2nd edn. New York: McGraw-Hill: 20; 22.)

[text from chapter 1] 'There are many different types of toxic compound producing the various types of toxicity **detailed in Chapter 6**.'

(Timbrell, J. 2000. *Principles of biochemical toxicology*. 3rd edn. London: Taylor and Francis: 3.)

- ________________

'**Table 1 lists five such 'Hazard Classes'** which are defined within constructions in Europe.'

(Thompson, R. (ed.) 1991. *The chemistry of wood preservation*. Cambridge: The Royal Society of Chemistry: 6.)

'**There are several very good examples** in current preservative systems which **illustrate** well the toxic habitat and how organisms overcome it to utilise the wood as a food source. Probably the best understood situation is the selection of preservative resistant basidiomycetes in service. A good example is the failure of the Copper Chrome preservatives to the copper tolerant brown-rot fungi, such as *Poria* species.'

(Thompson, R. (ed.) 1991. *The chemistry of wood preservation*. Cambridge: The Royal Society of Chemistry: 12.)

- __________________

'The type of root **just described** is the most common, generalized type comprising some or all of the roots of most plants.'

(Mauseth, J.D. 1995. *Botany: an introduction to plant biology*. 2nd edn. Philadelphia: Sanders College Publishing: 185.)

[text from chapter 26] 'One striking feature of zoonotic infections and of the arthropod-born infections **described in Chapter 25**, is that almost none are transmitted effectively from human to human.'

(Mims, C.A., J. Playfair, I. Roitt, D. Wakelin and R. Williams. 1998. *Medical microbiology*. 2nd edn. London: Mosby: 369.)

Journal articles:

- __________________

'These results indicate a more substantial inhibition of photosynthesis than merely feedback inhibition and support, to some extent, the findings of Wardle *et al.* (1979) and Grout and Millam (1985), **as discussed in the Introduction**.'

(Lees, R.P., E.H. Evans and J.R. Nicholas. 1991. Photosynthesis in *Clematis*, 'The President', during growth *in vitro* and subsequent *in vivo* acclimatization. *Journal of Experimental Botany*. 42.238: 609.)

'**As noted earlier**, with basal-diets containing grass silage of reasonable CP [crude protein] content, it is particularly important to consider the characteristics of the concentrate in relation to those of the grass silage.'

(Wilkins, R.J. and R. Jones. 2000. Alternative home-grown protein sources for ruminants in the UK. *Animal Feed Science and Technology*. 85.1-2: 29.)

- __________________

'**In this paper we present** the dose-response relation between gastroenteritis and exposure to sea water of varying microbial quality based on the results of the full four year programme.'

(Kay, D., J.M. Fleisher, R.L. Salmon, F. Jones, M.D. Wyer, A.F. Godfree, Z. Zelenauch-Jacquotte and R. Shore. 1994. Predicting likelihood of gastroenteritis from sea bathing: results from randomised exposure. *The Lancet*. 344: 905.)

'The Pearson correlation matrix was used with all available survey data (i.e. not restricted to case history sites, **discussed below**) to increase the size sample.'

'To test for management effects, analysis of variance (ANOVA) was performed on these indices after they were natural-log transformed; **summary statistics on the ANOVA are in Appendix 1**.'

(Swengel, A.B. and S.R. Swengel. 1997. Co-occurrence of prairie and barrens butterflies: applications to ecosystem conservation. *Journal of Insect Conservation*. 1: 133; 134.)

- ________________

'The approach **is outlined** in Figure 4. First, an inventory is made of the crop growth processes that are affected by the growth-reducing factor (Fig. 5; Rabbinge and Rijsdijk, 1981). Next, these (likely) damage mechanisms are ranked according to their relative importance.'

(Rossing, W.A.H., W. van der Werf and R. Rabbinge. 1997. Systems research in support of crop and plant health: the role of production ecology. *Agricultural Systems and Information Technology*. 7.1: 8.)

'**By extrapolation**, the combination of a reduced level of feeding and once-daily milking in late lactation **will probably increase** the risk of, and severity of, mastitis, at least in high SCC [somatic cell counts] cows.'

(Holmes, C.W., H. Kamote, D.D.S. Mackenzie, and P.C.H. Morel. 1996. Effects of a decrease in milk yield, caused by once-daily milking or by restricted feeding, on the somatic cell count in milk from cows with or without subclinical mastitis. *The Australian Journal of Dairy Technology*. 51 April: 11.)

References:

Crismore, A. and R. Farnsworth. 1990. Metadiscourse in popular and professional science discourse. In Nash, W. (ed.) *The writing scholar: studies in academic discourse*. Newbury Park, CA.: Sage: 118-136.

Hyland, K. 1999. Talking to students: metadiscourse in introductory course books. *English for Specific Purposes*. 18.1: 3-26.

Mauranen, A. 1993. Contrastive ESP rhetoric: metatext in Finnish-English economics texts. *English for Specific Purposes*. 12.1: 3-22.

Moreno, A.I. 1997. Genre constraints across languages: causal metatext in Spanish and English RAs. *English for Specific Purposes*. 16.3: 161-179.

Valero-Garcés, C. 1996. Contrastive ESP rhetoric: metatext in Spanish-English economics texts. *English for Specific Purposes*. 15.4: 279-294.

Unit 2 - Activities B
Reviews, previews and action markers
Answer sheets
(45 min.)

TEXT 2B-1

1. Group the underlined clauses or sentences in the table below according to their purpose/function. Some of them may have more than one purpose/function. The first two are done for you. (plenary: 15 min.)[2]

Reviews (explicit indicators that an earlier section of the text is being restated or summarised)	**Previews** (explicit indicators that a later section of the text is being anticipated)	**Action markers** (explicit indicators of what the writer says he/she is going to do next in the text)
1		1
2		

TEXT 2B-2

2. Now read the academic text you brought with you to the lesson. If you did not bring one, please ask for one. **Highlight** in different colours the reviews, previews and action markers. Some words, clauses or sentences may signal more than one thing at the same time. (individual: 10 min.)

Discuss briefly with your neighbour the usefulness of using them. (pair ork: 5 min.)

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[2] Participants were given part of the chapter 'Air masses and fonts' with some clauses or sentences underlined taken from Arhens, C.D. 1994. *Meteorology today: an introduction to weather, climate and the environment*. Minneapolis: West Publishing Company: 322-328.

TEXT 2B-3

3. Fill in the gaps with the missing words or expressions given in the table below.

Next classify them according to their purpose/function (i.e. review, preview or action marker). The first one is done for you. (pair work: 10 min.)

Words or expressions deleted from the text	**Number**	**Purpose/function in the text**
as we saw	**6**	**review**
as we shall see		
food and fodder crops in Chapter 12		
illustration of this		
in the growing season, as we shall see in Section 12.1		
in the preceding chapters of this book		
more difficult example		

Unit 2 - Activities B
Reviews, previews and action markers

TEXT 2B-3

3. Read the following text and answer the questions on the answer sheets provided. (pair work: 15 min.)

11 Crop Production and Yield

11.1. Meaning of yield

____1____ the emphasis has been firmly on the individual plant, but here the emphasis has to change. We are now concerned with the *crop*, a whole population of more or less similar plants growing together, interacting with one another as well as with their environment. A crop, ____2____, is not simply the sum of the individual plants it contains, and this is especially true in any consideration of the *yield* of the crop.

Yield sometimes means the weight of produce harvested from a single plant, for example an apple tree. However, yield defined as quantity of produce harvested per unit of land area is usually a more useful concept and it is in that sense we use it here.

11.1.1 Quality and quantity

In the growing of crops the farmer has two main aims. One is to provide a product of the right *quality*, to use on the farm or to sell on the market. We consider the question of quality of ____3____. The other principal aim of crop husbandry is to provide a sufficient *quantity* of the product required. What is meant here by "sufficient" depends on the type of agricultural system practised. In subsistence agriculture the grower has to produce at least enough to feed himself and his family and have a little left over to provide seed to be sown in the following year. In market economies the farmer has to produce a sufficient quantity of saleable commodities to cover the costs of growing his crops and keeping his animals and leave a margin of profit.

The quantity of utilizable or saleable crop produce harvested per unit of land area is the yield of the crop. Note, however, that in the concept of yield it is impossible to separate entirely the ideas of quantity and quality. Consider, for example, a crop of cabbages. Is the yield the weight of all the cabbages produced, including diseased, damaged, and under- or oversized specimens, or only the weight of those of good enough quality to be sold? Since the profitability of the crop will depend on the weight sold, this second quantity is in this case a more useful measure of yield.

.../...

(cont.)

To take a ____4____, what is the true yield of a crop of grass? The saleable product this time is seldom the grass itself but instead an animal product such as milk, beef or wool obtained by feeding the grass to livestock. If we were simply to measure the total weight of fresh grass produced we would have a measure of yield, but one that has little bearing on animal output because much of what we have weighed is water. A better measure would be the yield of *dry matter*, that is, the weight of all the chemical constituents of the grass (such as cellulose, sugars, protein and minerals) excluding water.

The dry matter yield of grass or any other fodder crop is still not an infallible guide to the likely level of animal output, because the nutritional quality of the dry matter varies greatly between species, with different management treatments and at different times ____5____. Ultimately it is the yield of the animal product itself that matters, and this depends almost as much on the quality as on the quantity of grass consumed.

In practice a compromise between quality and quantity usually has to be accepted since higher yields often lead to lower quality. It may be more profitable to produce a relatively small quantity of high-quality of an inferior product which is less easily marketable and cannot command such a high price.

11.1.2 Broader definitions of yield

There are other considerations besides direct yield and quality that may influence the farmer's choice of crop and the way he manages it. Many crops give by-products which, though of much lower value than the main product and not usually treated as part of the yield, find a use on or off the farm. For instance, sugar beet tops and cereal straw are fed to animals, and straw is also used as animal bedding.

Crops also have indirect beneficial effects. The unharvested parts of crops, including their root systems, help to maintain the organic matter content of soils which, ____6____ in Section 6.1.7, is important for the growth of succeeding crops. An important part of the role of legumes in many rotational cropping systems is the boost they give to succeeding crops such as cereals through the nitrogen fixed in the nodules and later released as nitrate to the soil.

In rotational agriculture it is thus the yield of the rotation as a whole that matters rather than the yield of any one crop in the rotation. As a further ____7____, certain crops permit interventions by the grower that may be important for the overall management of the rotation.

(Forbes, J.C. and R.D. Watson. 1992. *Plants in agriculture*. Cambridge: Cambridge University Press: 256-257.)

Unit 2 - Activity C

(20 min.)

TEXT 2C-1

Read the following passage taken from a textbook. Underline and label (R, P or AM) the clauses or sentences in which the writers are trying to help the reader to follow the text by:

R (Review) - referring to an earlier section of the text (e.g. chapter or paragraph) by restating or summarising what was written before;

P (Preview) - referring to a later section of the text (e.g. chapter or paragraph), that is, the text is being anticipated;

AM (Action Marker) - referring explicitly to what the writers say they are going to do next in the text (e.g. to illustrate this point let us consider….; the explanation is….).

The first one is done for you: the underlined sentence is labelled R

Chapter - 15 World Climates

Previous chapters examined the spatial and seasonal variations of weather and climate. Now we turn to the *combined* effects of these variations in different parts of the world. The varied nature of Earth's surface (oceans, mountains, plains, ice sheets) and the many interactions that occur among atmospheric processes give every location on our planet a distinctive (sometimes unique) climate. However, we cannot describe the climatic character of countless locales; that would require many volumes.

Instead, our purpose is to introduce you to the *major climate regions* of the world. We will examine large areas and zoom in on particular places to illustrate the characteristics of these major climate regions. In addition, for those regions that are probably unfamiliar to you (the tropical, desert, and polar realms), we briefly describe the landscape. Keep in mind that this chapter is a general summary of world climates using some specific examples.

In Chapter 1, we mentioned the common misconception that climate is only "the average state of the atmosphere". Although averages are certainly important to climate descriptions, variations and extremes must also be included to portray accurately the character of an area.

Temperature and precipitation are the most important elements in climate descriptions because they have the greatest influence on people and their activities and also have an important impact on the distribution of vegetation and the development of soils. Nevertheless, other factors are also important for a complete climate description. When possible some of these factors are introduced into our discussion of world climates.

Climate Classification

The worldwide distribution of temperature, precipitation, pressure, and winds is, to say the least, complex. Because of the many differences from place to place and time

…/…

(cont.)

to time, it is unlikely that any two places that are more than a very short distance apart can experience identical weather. The virtually infinite variety of places on Earth makes it apparent that the number of different climates must be extremely large. Having such a diversity of information to investigate is not unique to the study of the atmosphere. It is a problem basic to all science. (Consider astronomy, which deals with billions of stars, and biology, which studies millions of complex organisms.) To cope with such variety, we must devise some means of *classifying* the vast array of data to be studied. By establishing groups of items that have common characteristics, order and manageability are introduced. Bringing order to large quantities of information not only aids comprehension and understanding, but also facilitates analysis and explanation.

The first attempt at climate classification probably was made by the ancient Greeks, who divided each hemisphere into three zones: *torrid*, *temperate* and *frigid* (Figure 15-1). The basis of this simple scheme was Earth-Sun relationships. The boundaries were the four astronomically important parallels of latitude: the Tropic of Cancer (23.5° north), the Tropic of Capricorn (23.5° south), the Arctic Circle (66.5° north) and the Antarctic Circle (66.5° south). Thus, the globe was divided into winterless climates and summerless climates and an intermediate type that had features of the other two.

Few other attempts were made until the beginning of the twentieth century. Since then, many climate-classification schemes have been devised. Remember that the classification of climates (or anything else) is not a natural phenomenon but the product of human ingenuity. The value of any particular classification system is determined largely by its *intended use*. A system designed for one purpose may not work well for another.

In this chapter, we use a classification devised by the German climatologist Wladimir Köppen (1846-1940). As a tool for presenting the general world pattern of climates, the Köppen classification has been the best-known and most used system for decades. It is widely accepted for many reasons. For one, it uses easily obtained data: mean monthly and annual values of temperature and precipitation. Furthermore, the criteria are unambiguous, relatively simple to apply, and divide the world into climate regions in a realistic way.

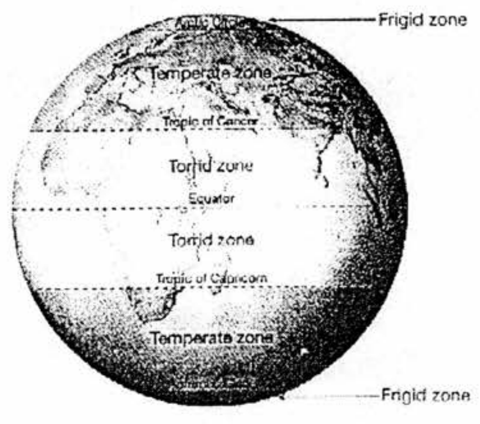

Figure 15-1 Probably the first attempt at climate classification was made by the ancient Greeks. They divided each hemisphere into three zones. The winterless *torrid zone* was separated from the summerless *frigid zone* by the *temperate zone*, which had features of the other two.

(cont.)

Köppen believed that the distribution of natural vegetation was the best expression of overall climate. Consequently, the boundaries he chose were largely based on the limits of certain plant associations. He recognized five principal climate groups, each designated by a capital letter:

A. Humid tropical. Winterless climates; all months having a mean temperature above 18°C.

B. Dry. Climates where evapotranspiration exceeds precipitation; there is a constant water deficiency.

C. Humid middle-latitude, mild winters; the average temperature of the coldest month is below 18°C but above – 3°C.

D. Humid middle-latitude, severe winters; the average temperature of the coldest month is below – 3°C and the warmest monthly mean exceeds 10°C.

E. Polar. Summerless climates; the average temperature of the warmest month is below 10°C.

Notice that four of these major groups (A, C, D, E) are defined on the basis of *temperature*. The fifth, the B group, has *precipitation* as its primary criterion.
Each of the five groups is further subdivided by using the criteria and symbols presented in Table 15-1.

A strength of the Köppen system is the relative ease with which boundaries are determined. However, these boundaries cannot be viewed as fixed. On the contrary, all climate boundaries shift their positions from one year to the next (Figure15-2). The boundaries shown on climate maps are simply average locations based on data collected over many years. Thus, a climate boundary should be regarded as a broad transition zone and not a sharp line (see Box 15-1).

The world distribution of climates, according to the Köppen classification, is shown in Figure 15-3. We will refer you to this map several times as we examine Earth's climates in the following pages.

pages.

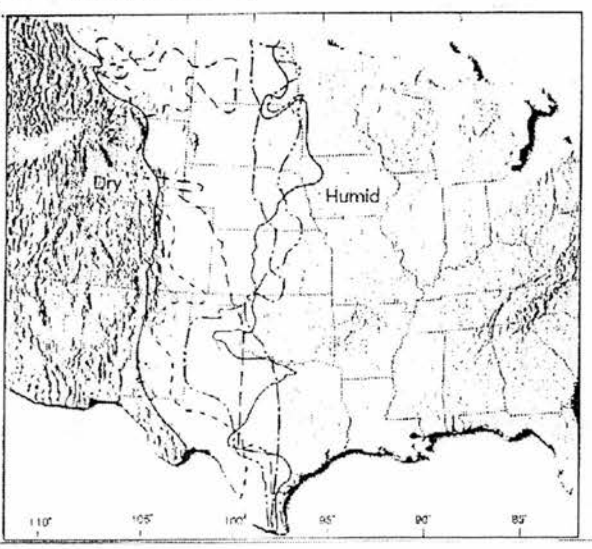

Figure 15-2 Yearly fluctuations in the dry–humid boundary during a 5-year period. (After C. E. Koeppe and G. C. DeLong. *Weather and Climate*. © 1958 McGraw-Hill Book Company; reprinted by permission of the publisher)

.../...

(cont.)

Table 15-1 Köppen system of climate classification*

LETTER SYMBOL			
1ST	2ND	3RD	
A			Average temperature of the coldest month is 18°C or higher
	f		Every month has 6 cm of precipitation or more
	m		Short dry season; precipitation in driest month less than 6 cm but equal to or greater than 10-R/25 (R is annual rainfall in cm)
	w		Well-defined winter dry season; precipitation in driest month less than 10-R/25
	s		Well-defined summer dry season (rare)
B			Potential evaporation exceeds precipitation. The dry-humid boundary is defined by the following formulas: (Note R is the average annual precipitation in cm and T is the average annual temperature in °C) $R< 2T + 28$ when 70% or more of rain falls in warmer 6 months $R< 2T$ when 70% or more of rain falls in cooler 6 months $R< 2T + 14$ when neither half year has 70% or more of rain
	S		Steppe The BS-BW boundary is ½ the dry-humid boundary
	W		Desert
		h	Average annual temperature is 18°C or greater
		k	Average annual temperature is less than 18°C
C			Average temperature of the coldest month is under 18°C and above – 3°C
	w		At least ten times as much precipitation in a summer months as in the driest winter month
	s		At least three times as much precipitation in a winter months as in the driest summer month; precipitation in driest summer month less than 4 cm
	f		Criteria for w and s cannot be met
		a	Warmest month is over 22°C; at least four months over 10°C
		b	No month above 22°C; at least four months over 10°C
		c	One to 3 months above 10°C
D			Average temperature of coldest month is – 3°C or below; average temperature of warmest month is greater than 10°C
	s		Same as under C
	w		Same as under C
	f		Same as under C
		a	Same as under C
		b	Same as under C
		c	Same as under C
		d	Average temperature of the coldest month is – 38°C or below
E			Average temperature of the warmest month is below 10°C
	T		Average temperature of the warmest month is greater than 0° C and less than 10°C
	F		Average temperature of the warmest month is 0° C or below

* When classifying climate data using Table 15-1, you should first determine whether the data meet the criteria for the E climates. If the station is not a polar climate, proceed to criteria for B climates. If your data do not fit into either the E or B groups, check the data against the criteria A, C, and D climates, in that order.

(Lutgens, F.K. and Tarbuck, E.J. 1998. *The atmosphere*. 7th edn. London: Prentice-Hall International, Inc: 349-350.)

Unit 3 - Plan
Connectors

I. Aims

Unit 3 concentrates on the use of connectors as explicit indicators of the relationships between propositions in the text.

II. Methodology and materials

1. Warm-up: Activities A

- Reading a text with connectors highlighted. Answering two reading comprehension questions and two questions about the use of connectors. Translating connectors into Portuguese. (S: individual)
- Reading a text taken from a textbook where pairs of connectors are highlighted. Selecting the correct answer from each pair. (S: individual)

2. Lesson

- Checking the answers to Activities A (key is given). (S/T)
- The unit handout will be distributed and briefly commented on: explaining the use of connectors in academic texts. (T)
- Discussing connectors use in different academic genres (e.g. research article and textbook). (T/S)

Activities B:

Task 1: Looking at the connectors highlighted in a text taken from a university textbook and grouping them in the table according to their meaning. Students can use the table in the handout. (S: pairs)

Task 2: Filling in blanks with words given in a box before the passage. (S: individual)

Task 3: Filling in blanks with connectors. (S: pairs)

Task 4: Identifying connectors in the academic text brought by each participant. In case they did not bring one, a text will be supplied[1]. (S: individual or pairs)

3. Follow-up: Activities C

- Reading a text with connectors highlighted. Answering two reading comprehension questions and two questions about the use of connectors. Translating connectors into Portuguese. (S: individual)
- Reading a text taken from a textbook where pairs of connectors are highlighted. Selecting the correct answer from each pair. (S: individual)

4. Answering a short questionnaire (S: individual)

5. **Homework**

III. Schedule

1. **Warm-up: Activities A** (20 min.)

2. **Lesson**
- Explanation and discussion (15 min.)
- **Activities B**:
  Task 1. (5 min.)
  Task 2. (10 min.)
  Task 3. (10 min.)
  Task 4. (15 min.)

3. Follow-up: Activities C (20 min.)

4. Short questionnaire (5 min.)

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[1] Lester, P.J., H.M.A. Thistlewood and R. Harmsen. 1998. The effects of refuge size and number on acarine predator-prey dynamics in a pesticide-disturbed apple orchard. *Journal of Applied Ecology*. 35: 329-331.

Unit 3 - Activities A

(20 min.)

TEXT 3A-1

1. Read the following extract taken from the textbook *The atmosphere* and answer the questions on the answer sheets provided.

Introduction to the atmosphere

Ozone Depletion – A Global Issue

The loss of ozone high in the atmosphere as a consequence of human activities is a serious global-scale environmental problem. For nearly a billion years, Earth's ozone layer has protected life on the planet. **1. <u>However</u>**, over the past half century, people have unintentionally placed the ozone layer in jeopardy by polluting the atmosphere. [...]

They [Three scientists, Paul Crutzen, F. Sherwood Rowland, and Mario Molina,] discovered that **2. <u>because</u>** CFCs [chlorofluorocarbons] are practically inert (**3. <u>that is</u>**, not chemically active) in the lower atmosphere, a portion of these gases gradually makes its way to the ozone layer, where sunlight separates the chemicals into their constituent atoms. The chlorine atoms released this way, through a complicated series of reactions, have the net effect of removing some of the ozone.

The Ozone Hole

4. <u>Although</u> ozone depletion by CFCs occurs worldwide, measurements have shown that ozone concentrations take an especially sharp drop over Antarctica during the Southern Hemisphere spring (September and October). Later, during November and December, the ozone concentration recovers to more normal levels. Between 1985 **5. <u>when</u>** it was discovered and the mid-1990s, this well-publicized *ozone hole* intensified and grew larger. By 1995, it covered an area more than twice the size of the continental United States (Figure 1-7).

The hole is caused in part by the relatively abundant ice particles in the south polar stratosphere. The ice boosts the effectiveness of CFCs in destroying ozone, **6. <u>thus</u>** causing a greater decline than would otherwise occur. The zone of maximum depletion is confined to the Antarctic region by a swirling upper-level wind pattern. When this vortex weakens during the late spring, the ozone-depleted air is no longer restricted and mixes freely with air from other latitudes where ozone levels are higher.

A few years after the Antarctic ozone hole was discovered, scientists detected a similar but smaller ozone thinning in the vicinity of the North Pole during spring and early summer. When this pool breaks up, parcels of ozone-depleted air move southward over North America, Europe, and Asia.

.../...

(cont.)

Effects of Ozone Depletion

Because ozone filters out most of the UV [ultraviolet] radiation in sunlight, a decrease in its concentration permits more of these harmful wavelengths to reach Earth's surface. What are the effects of the increased ultraviolet radiation? Each 1 percent decrease in the concentration of stratospheric ozone increases the amount of UV radiation that reaches Earth's surface by about 2 percent. **7. Therefore**, because ultraviolet radiation is known to induce skin cancer, ozone depletion seriously affects human health, especially among fair-skinned people and those who spend considerable time in the sun.

The fact that up to a half million cases of these cancers occur in the United States annually means that ozone depletion could ultimately lead to many thousands of additional cases each year. **8. In addition to** enhancing risks from skin cancer, an increase in damaging UV radiation can negatively impact the human immune system as well as promote cataracts, a clouding of the eye lens that reduces vision and may cause blindness if not treated.

The effects of additional UV radiation on animal and plant life are **9. also** important. There is serious concern that crop yields and quality will be adversely affected. Some scientists also fear that increased UV radiation in the Antarctic will penetrate the waters surrounding the continent and impair or destroy microscopic plants, called phytoplankton, that represent the base of the food chain. A decrease in phytoplankton, in turn, could reduce the population of copepods and krill that sustain fish, whales, penguins, and other marine life in the high latitudes of the southern hemisphere.

(Lutgens, F.K. and E.J. Tarbuck. 1998. *The atmosphere*. 7th edn. London: Prentice-Hall International, Inc: 8-9.)

TEXT 3A-2

2. Read the following passage taken from a botany textbook. Select the correct word from the two alternatives given in the text below. Answer on the answer sheets provided.

Roots and the world politics

Taproots are important to us as foods, examples being carrots (*Daucus carota*), sweet potato (*Ipomoea batatas*), beets (*Beta vulgaris*), turnips (*Brassica campestris*), and radishes (*Raphanus sativus*). None of these is a dominant food, they are eaten in small amounts or only occasionally. One reason is that their food value is rather low. These fleshy taproots store carbohydrates, and the root parenchyma cells tend to be large and filled with amyloplasts – little cytoplasm, proteins, vitamins, or essential fatty acids are present. **1. Conversely/ For example**, one sweet potato has only 2 g of protein **2. but/ therefore** 37 g of carbohydrate; for other root crops, the values are: beets, 1 versus 7; carrots, 1 versus 11; turnips, 1 versus 8. **3. In contrast/ In addition** one cup of peanuts has 37 g of protein versus 27 g of carbohydrates; red kidney beans have 15 versus 42; wheat, 13 versus 71. The roots of horseradish (*Armoracia rusticana*) are also poor in protein, **4. therefore/ but** they are consumed for their pungent allyl isothiocyanate, not for nutrition.

High carbohydrate content is of value in one particular fleshy taproot: sugar beets (*Beta vulgaris*). This is the same species as the red beet we eat as a vegetable; one has been bred for high sugar content, the other for pigments and flavor. The history of this breeding is an interesting example of the interaction of food, botanical science, and global politics. Throughout most of history, honey was the only readily available sweetener until ancient Arabians developed the process of refining sugar from sugarcane. During the great colonial period of Spain and Portugal in the 1500s and 1600s, sugarcane was spread throughout the tropics. With changing political fortunes, by the early 1800s the British controlled many of the sugar-producing territories directly or the sea lanes by which sugar was shipped to Europe. **5. First/ After** Napoleon came to power, Britain was able to blockade France, cutting off supplies of sugar and other materials.

Fortunately for Napoleon, sugar had been discovered in beets in 1590, and by 1747 a German chemist, Andrea Marggraf, had discovered that some beets are sweeter than others. Plant breeders began improving on this by artificially selecting plants with the greatest sugar and eliminating those with the least; sugar content was raised gradually from 2 to 20%. Napoleon realized the potential of these plants, which grow in Europe **6. whereas/ moreover** sugarcane does not, and encouraged their cultivation in France as a means of defying the British. Before this could be of much significance, **7. furthermore/ however**, Napoleon was defeated at Waterloo in 1815. [...]

Sugar beets and world politics have also affected the United States. At one time most of our sugar was made from imported Cuban sugarcane. **8. Before/ After** Fidel Castro came to power in 1959, all imports of sugar from Cuba were banned and sugar beet cultivation in the United States increased tremendously. It **9. yet/ also** caused a problem for the Union of Soviet Socialist Republics: They have had to buy the entire Cuban sugarcane crop every year at great expense, **10. even though/ on the other hand** Russia is the world's leading producer of sugar beets.

(Mauseth, J.D. 1995. *Botany: an introduction to plant biology*. 2nd edn. Philadelphia: Sanders College Publishing: 186.)

Unit 3 - Activities A
Answer sheets
(20 min.)

TEXT 3A-1

1. Answer the questions below:

You can answer questions 1.1, 1.2, 1.3 and 1.4 either in English or in Portuguese.

1.1 How long has the ozone layer depletion become a major problem?

1.2 Apart from skin cancer what are the risks for human beings induced by ozone depletion?

1.3 Did the **highlighted** words help you in finding the answers to the above questions
(1.1 and 1.2)?

1.4 Why do you think the writers have used these words?

1.5 Translate the words **highlighted** into Portuguese and answer the question in the table. The first one is done for you.

Number	Word	Translation	Did the context help you find out the translation? (Yes/No)
1.	However	**no entanto**	
2.	Because		
3.	That is		
4.	Although		
5.	When		
6.	Thus		
7.	Therefore		
8.	In addition to		
9.	Also		

TEXT 3A-2

2. Select the correct word from the two alternatives given in the text. Complete the table below. The first one is done for you.

1	**For example**
2	
3	
4	
5	
6	
7	
8	
9	
10	

Unit 3
Connectors

Aims

To focus on words which indicate, in an explicit way, the relationship between ideas in the text and thus help you while reading.

Anglo-American writers, in general, tend to have a more reader-oriented attitude as shown in Unit 2, e.g. helping their readers to follow their line of argument by making explicit the connections between different ideas and facts in the text. One way of achieving this is through the use of **connectors (or linking words and phrases)**.

1. Definition

Connector

- It is a word or a phrase (i.e. group of words) which joins sentences or paragraphs, making the relationship between them clear and direct.
- It is an explicit marker signalling to the reader how to make sense of different chunks of the text and relate them to each other.

2. Use

- It varies across disciplines and type of text.
-

Research articles tend to use less connectors than textbooks because:

  - **research articles**: specialist readers are more easily able to infer underlying relationships between sentences and the structure of the text;
  - **textbooks**: writers want to help students by marking connections between the ideas in their writing.

- It may possibly be influenced by constraints such as length (i.e. number of pages or words) allowed by certain academic journals.

3. Functions

- to help understand how the ideas in a text are related;
- to help make more accurate predictions during reading (e.g. what is going to come next in the text).

4. Examples

Underline the connectors in the examples below. The first one is done for you.

Journal articles:

'Rapid water infiltration indicated little compaction of the Rosamond loam soil at this site. **In contrast**, an adjacent site with Rosamond loam soil (fig. 4) exhibited slow water infiltration, suggesting soil compaction, and no shrub establishment.'

(Grantz, D.A., D.L. Vaughn, R.J. Farber, B.Kim, T. VanCuren, R. Campbell, D. Bainbridge and T. Zink. 1998. Though difficult to achieve, revegetation is best way to stabilize soil. *California Agriculture*. 52.4: 12.)

'*Listeria monocytogenes* has been identified as a serious foodborn pathogen. It is also widespread in the environment on plants and excreted by animals, both which are sources of human food. There is therefore concern that these raw material ingredients may also be a source of *L. monocytogenes* strains responsible for human listeriosis. However, most of the food products which have been implicated in the large recorded outbreaks of human listeriosis have received a high degree of processing.'

(Fenlon, D.R., J. Wilson and W. Donachie. 1996. The incidence and level of *Listeria monocytogenes* contamination of food sources at primary production and initial processing. *Journal of Applied Bacteriology*. 81: 641.)

Textbooks:

'A frequently used term in insect sampling is the sampling universe. In statistics the term often refers to the whole population from which samples are taken. In other words, universe and population are synonymous. However, in insect sampling, the sampling universe has come to represent the habitat in which the population occurs. Consequently, sampling units and samples are taken within the sampling universe. For example, we determine that essentially all of a population of bean leaf beetle eggs is found in the soil within 8 cm on either side of a soybean row and no deeper than 4 cm.'

(Pedigo, L.P. 1999. *Entomology and pest management*. 3rd edn. Upper Saddle River, N.J.: Prentice Hall: 211-212.)

'Although immunization can result in lymphocytes capable of producing the required antibody, the cells will only grow for a limited period of time. The purpose of the lymphocyte hybridization is to combine the desired property of antibody synthesis of the B- lymphocyte population with the infinite growth capacity of a myeloma. Therefore, the selected lymphocytes are fused with a population of myeloma cells.'

(Butler, M. 1996. *Animal cell culture and technology: the basics*. Oxford: IRL Press: 59.)

Table 1: Some connectors used in academic writing. (adapted from Nation 1990: 251-252.)

Relationship[1]	Connectors	Meaning	Most important part
1. inclusion (addition)	also and furthermore in addition moreover similarly	A and B should be considered together	AB
2. alternative	alternatively conversely nor on the other hand by contrast/ in contrast or	A and B represent alternatives	AB
3. time; arrangement	after before finally first in the first place subsequently then when while	A and B ordered in time or sequence	AB
4. explanation	in other words namely that is (to say)	B restates or names A	AB
5. amplification	can be divided into consists of therefore thus to be more specific	B describes A in more detail	A
6. exemplification (could be included in the 'amplification' class)	for example for instance such as thus	B is an example of A	A
7. summary/ conclusion	in short to put it briefly to sum up	B summarises A	B
8. cause-effect	as a result because consequently hence in order to since then thus	A is the cause of or reason for B	B
9. contrast	although but despite however nevertheless nonetheless on the other hand still yet	B is contrary to the expectation raised by A	B
10. exclusion	instead rather than on the contrary	B excludes A	B

1. Most relationships involve only two parts. However 'inclusion', 'alternative' and 'time and arrangement' may involve more than two.

Note:

→ In academic writing, connectors that express contrast (see Table 1 above) such as **however**, **despite** and **nevertheless** are commonly used to introduce a problem or a gap in the research which justifies the present work (Swales and Feak 1994a):

e.g. Problem: '**However**, it is not known which aspects of the *in vitro* environment affect these stomatal responses.'

e.g. Gap: '**Despite** abundant documentation on the response of stomata from plantlets produced in culture, a systematic study testing a whole range of concentrations of these factors is lacking.'

(Santamaria, J.M., W.J. Davies and C.J. Atkinson. 1992. Stomata of micropropagated *Delphinium* plants respond to ABA, CO_2, light and water potential, but fail to close fully. *Journal of Experimental Botany*. 44. 258: 99; 100.)

Further reading:

Chalker, S. 1996. *Linking words*. London: HarperCollins Publishers.

Jordan, R.R. 1990. *Academic writing course*. 2nd edn. Harlow: Longman.

Swales, J.M. and C.B. Feak. 1994a. *Academic writing for graduate students*. Ann Arbor, Michigan: The University of Michigan Press.

Swales, J.M. and C.B. Feak. 1994b. *Academic writing for graduate students: commentary*. Ann Arbor, Michigan: The University of Michigan Press.

Other references:

Hyland, K. 1999. Talking to students: metadiscourse in introductory course books. *English for Specific Purposes*. 18.1: 3-26.

Nation, I.S.P. 1990. *Teaching and learning vocabulary*. Boston, Mass.: Heinle and Heinle Publishers.

Unit 3 - Activities B
Connectors
(40 min.)

TEXT 3B-1

1. Read the text below paying special attention to the words **highlighted** and complete the table on the answer sheets provided. (pair work: 5 min.)

Sampling units and samples

The nature of insect sampling is greatly characterized by the sampling units selected. A *sampling unit* is a proportion of the habitable space from which insect counts are taken. **Therefore**, the insect population can be envisioned as being composed of a finite number of distinct sampling units. Among other criteria, the size of the habitable proportion is determined by the sampler, but the units themselves must be distinct and not overlap. Together, all sampling units contain the population.

The sampling-unit concept is most easily explained when total counts are taken from a unit-area of land surface. **For example**, direct counts of all the caterpillars in 1 m^2 of alfalfa could be considered a sampling unit. If the caterpillar population occupies 100 m^2, the habitable space is composed of 100 sampling units.

It is more difficult to visualize sampling units when total counts from unit areas are not used. **For instance**, a sampling unit based on collecting looper caterpillars in cotton with an insect sweep net may consist of taking 20 sweeps down the row. Yet, the sweep net makes contact with only a portion (for example, the upper third) of each plant that is swept. **However**, the whole canopy, or the part inhabited by loopers, can be divided into a finite number of nonoverlapping 20-sweep units. **Even though** not all loopers are captured when a unit of habitable space is swept, the count taken is relative to other counts taken in a similar manner and, **therefore**, is useful for comparisons of population densities.

Another example of sampling units related to relative counts involves the use of insect light traps. Here, the light trap has a certain effective range of attracting and capturing cutworm adults. The total area occupied by flying adults encompasses a finite number of spaces for trap placement, so that one trap does not influence the catch of another. **Consequently**, the sampling unit becomes the trap area of capture and duration of operation. The resulting estimate is used to compare numbers in time and space with other traps of the same configuration and operating specifications.

Because it is usually impractical to count all insects in all the sampling units, a group of such units is delineated, which is then used to characterize the whole population. This group of sampling units is referred to as a *sample*, and it is from the sample that an estimate is made. Both sampling-unit size and number taken for a sample are dictated by the sampling design. Information on design and procedures to establish sampling-unit size and number will be discussed later in this chapter.

(Pedigo, L.P. 1999. *Entomology and pest management*. 3rd edn. Upper Saddle River, N. J.: Prentice Hall: 212.)

TEXT 3B-2

2. In the text below taken from a botany textbook some connectors **have been deleted**. Complete the task on the answer sheets provided. (individual work: 10 min.)

Plants and people

The many types of organic compounds described in this chapter actually constitute only a small fraction of the large number of diverse organic compounds that plants produce. In addition, organic compounds act as flower pigments, aromas, plant hormones, and defensive compounds that are either irritating or distinctly poisonous. A remarkable aspect of plant metabolism is that during photosynthesis, plants use CO_2 and water to make a single simple organic compound, 3-phosphoglyceraldehyde. __1__ by altering it chemically with various enzymes, the plants use 3-phosphoglyceraldehyde to construct numerous types of carbohydrates and lipids. By adding simple compounds of nitrogen, phosphorus, sulfur, and so on, all derived from the soil, the plants use 3-phosphoglyceraldehyde and its derivatives to make amino acids and proteins, nucleotides and nucleic acids, and every other compound in themselves. Actually, to build its entire body and carry out its metabolism, a green plant needs only sunlight, carbon dioxide, water, and a few minerals.

In contrast to a plant's well-balanced diet (light, air, water, soil), our complex well-balanced diet is much more complex, requiring vitamins, essential amino acids, essential fatty acids, and a variety of other compounds. By analyzing the underlying causes of this difference, we can begin to understand certain critical concepts in biology. First, animals cannot photosynthesize because they lack the necessary pigments and enzymes; __2__, animals eat plants or other animals as food and then use much of the food's carbohydrate, fat, and protein components for energy production: They respire – oxidize – it and generate energy carriers such as ATP and NADPH + H^+. __3__ animals eat the carbohydrates, fats, and proteins, they digest them to their constituent monomers – the simple sugars, fatty acids, amino acids, and so on. __4__ it is possible for animals to break these down even further, that would be wasteful. It would require energy and special metabolism to break down the monomers, which would then have to be rebuilt. All plants and animals use the same amino acids, the same nucleotides, and mostly the same fatty acids and sugars. __5__, as an animal eats a plant, it obtains all the vitamins the plant has produced and uses them in its own metabolism. A mutation in an animal that prevents it from synthesizing a particular amino acid or nucleotide is not deleterious to the animal __6__ it probably gets all that it needs from its food. In fact, it may be slightly advantageous selectively: That animal is not using up resources to make something it gets in its diet, so those extra resources can be used for other needs such as reproduction, defense, growth, and so on.

(Mauseth, J.D. 1995. *Botany: an introduction to plant biology*. 2nd edn. Philadelphia: Sanders College Publishing: 25.)

TEXT 3B-3

3. In the text below some connectors **<u>have been deleted</u>**. Complete the task on the answer sheets provided. (pair work: 10 min.)

Links between environmental problems

As was noted above, today's environmental problems connect the lives of people in very distant regions of the Earth, connect the Earth with the atmosphere and affect very diverse communities. With the aid of two detailed examples we shall examine this particular point more closely. In doing so, we shall highlight a further characteristic feature of present-day environmental problems: the unequal distribution of causes and effects.

Deforestation is a good example of both the scale on which and the rate at which we are changing our natural environment. During the period since 1850, the area of the Earth which is covered by forest has declined from 6 billion to 4 billion hectares. There has been a particularly sharp increase in the rate of decline during the past few decades. The tropical region, where some 60% of the world's remaining forests are located, has suffered most in this process. __1__, whereas just 40 years ago 30% of Ethiopia consisted of forest, today only 1% of the country is covered by forest.

At the beginning of this century, more than half of India was covered by forest. Today, the figure is just 14%. Although there are plenty of other, similar examples, the trend is clear: the tropical rainforests are rapidly disappearing. It is estimated that 20 million hectares are lost every year. The process has both a local and a global impact. Among the local effects are increasing erosion, the silting up of rivers and the flooding of farmlands. On a global scale, the consequences include a loss of habitats for species and an accelerating and irreversible destruction of genetic diversity. The effect of the latter is to deprive future generations of genetic material which they may need for developing medicines and disease-resistant food crops. The same effects may also be felt by whole ecosystems, which could be thrown out of balance as a result. __2__, deforestation also results in a net release of carbon dioxide, and hence contributes to the greenhouse effect.

The greenhouse effect provides the second example. __3__ natural sources are the primary producers of greenhouse gases, anthropogenic sources are becoming ever more important in this respect. Carbon dioxide accounts for approximately half of all the gases which we introduce into the atmosphere, and the amount involved has increased dramatically in the course of time. Until around the middle of the last century, the amount of carbon dioxide in the atmosphere represented about 275 parts per million (ppm). This amount has risen during the intervening period to 350 ppm, with the rate of increase being currently estimated at 1.8 ppm (or 0.5%) per annum. The concentration of other greenhouse gases, such as methane, CFCs [chlorofluorocarbons] and nitrous oxide, is also on the increase. The probable result of this process will be a rise in the temperature on Earth and __4__ a rise in the sea level. This will have a disastrous effect not only on the climate but also on the suitability of large parts of the world for human life. On the one hand, there is considerable uncertainty as to the precise effects. Although there is now proof that the volume of greenhouse gases is increasing, the effects can only be predicted with the aid of models. __5__, it is too risky to wait and see whether the predictions actually come true. If they do, and nothing has been done in the meantime, it will no longer be possible to turn the clock back.

.../...

(cont.)

These two examples of environmental problems show that there may be a link between what seem at first sight to be unconnected. The felling of rainforests, which is restricted geographically to a number of tropical regions, has an impact all over the world. The same applies to global warming, the sources of which are not evenly distributed over the world.

(Glasbergen, P. and A. Blowers (eds.) 1995. *Environmental policy in an international context: perspectives*. London: Arnold: 5-6.)

TEXT 3B-4

4. Now read the academic text you brought with you to the lesson. If you did not bring one please ask for one. **Highlight** the connectors used in the text. Then compare your answers with your neighbour and discuss briefly the usefulness of using connectors. (15 min.)

DISCUSSION

After spraying the orchard with the pyrethroid permethrin, the predatory mite abundance decreased sharply, which is in agreement wit other studies (reviewed by Gerson & Cohen 1989). Correlated with the decrease in predatory mites, the densities of tetranychid mites *P. ulmi* and *Tetranychus urticae* increased on sprayed leaves relative to their densities on unsprayed leaves in refuges. For example, the mean orchard density of *P. ulmi* on sprayed leaves reached 69.0 $leaf^{-1}$, compared to 20.4 $leaf^{-1}$ on unsprayed leaves in refuges. This sprayed leaf peak density is over four times the estimated economic threshold (Croft & McGroarty 1977). The predator *Typhlodromus caudiglans* was virtually eliminated from sprayed leaves for 5 weeks after spraying, but populations were maintained on refuge leaves. However, the reduced predation may not have been the only factor in the increased tetranychid densities on sprayed leaves, as pyrethroids can increase factors such as the fecundity and dispersal behaviour of tetranychid mites (reviewed by Gerson & Cohen 1989).

The efficacy of a predatory mite for biological control depends on its predation rate, population growth rate, and its ability to disperse and spatially couple with prey populations (Sabelis 1992; Lesna, Sabelis & Conijn 1996). Our initial aim in this study was to manipulate the size of the refuge and, hence, the predator population in each treatment at the time of disturbance. These predators could then have acted as a founder population for each tree subsequent to spraying. However, densities of *T. caudiglans* on sprayed leaves remained low and uncoupled with those *P. ulmi* for at least 5 weeks after spraying. This effect was probably due to residual effects of the pyrethroid, killing or repelling *T. caudiglans* (Penman, Chapman & Jesson 1981; Bostanian, Belanger & Rivard 1985). We may have observed a different effect if we used a pesticide with a low

.../...

(cont.)

residual effect. However, significant effects were noted between entire-tree densities of the phytophagous mites *P. ulmi* and *A. schlechtendali*, indicating increased biological control in trees with larger refuge sizes.

For the phytophagous mites, sprayed leaves became a partial refuge from *T. caudiglans* predation, in that the predation rate was not completely eliminated, but rather the probability of predation was much reduced. During this time the major effect of the refuges was to decrease the entire-tree *P. ulmi* density, and maintain a predator population. Only after 7 weeks, when permethrin residues have usually dissipated significantly (Bostanian, Belanger & Rivard 1985), did *T. caudiglans* begin to appear in similar numbers on sprayed leaves to those on refuge leaves. For the completely sprayed, 10 and 30% treatments the *T. caudiglans* recolonization occurred at a similar time, suggesting that aerial dispersal from other trees was at least as important as recolonization from refugia within a tree. Aerial dispersal is also the method for recolonization of pesticide-disturbed habitat for other arthropod predators such as spiders, local populations of which may become extinct without refuges (Halley, Thomas & Jepson 1996).

A high aerial dispersal rate may have resulted in the observed lack of significant effects of refuge number. We hypothesized initially that the number of refuges within a tree could be important in aiding dispersion of the predator to otherwise remote prey populations, reducing the dispersal distance necessary to find the prey population. Even though *T. caudiglans* is supposedly a poor disperser relative to other phytoseiid mites (Johnson & Wellington 1984), refuge number effects were not significant. Consequently, for management practices, it appears that a single large refuge may be as effective as numerous small refuges. A high percentage of the variation in entire-tree predator and prey densities could be explained simply by the size of refuges.

The role of refuges in decreasing the amplitude of predator-prey oscillations has been noted elsewhere (Huffaker 1958; Murdoch *et al.* 1989; Hawkins, Thomas & Hochberg 1993), though not in the context of pesticide treatment. Earlier work has concentrated on providing prey species with a refuge in order to avoid over-exploitation of the prey by predators. In our study the effect was to provide a refuge for predators to avoid an extrinsic mortality factor (the pyrethroid spray), which would have destabilized the prey-predator system by the near complete elimination of predators leading to rapid population expansion of the prey species. Predator populations in refuges acted by decreasing the mean entire-tree density of phytophagous mites, rather than the refuges providing a population of predators for dispersion to sprayed leaves. A high percentage of the variation in entire-tree predator and prey densities could be explained simply by the size of refuges. The predators *T. caudiglans* and *Z. mali* appeared to limit *P. ulmi*, *A. schlechtendali* and, to a lesser extent, *Tetranychus urticae* densities in unsprayed trees or refuges.

.../...

(cont.)

Densities of *Z. mali* were initially only slightly reduced on sprayed leaves and, subsequently, populations of this predator equalled or exceeded those on refuge leaves. However, *Z. mali* alone was unable to control the *P. ulmi* outbreak on sprayed leaves. This result is similar to that of Santos & Laing (1985) who showed that *Z. mali* is much less voracious than are phytoseiids, and is unable to control *P. ulmi* outbreaks. In fact, the presence of *Z. mali* in North American orchards has been shown in some cases to inhibit biological control of *P. ulmi* and *T. urticae* through intra-guild predation or competition (Clements & Harmsen 1990; MacRae & Croft 1996). This effect was highlighted in simulations which consistently showed decreased *Typhlodromus caudiglans* populations and increased *P. ulmi* populations, as densities of *Z. mali* increased (Woolhouse & Harmsen 1987). In the present study, *Z. mali* may have thus inhibited *T. caudiglans* recolonization and consequent biological control of *P. ulmi* onto sprayed leaves.

The creation of large refuges throughout time may serve to encourage predator diversity within managed orchards, as Hochberg & Hawkins (1992) postulated. In our study we commonly observed only two major predators, *T. caudiglans* and *Z. mali*. Compared to unsprayed orchards in this area, this is a much reduced predator diversity (Thistlewood 1991). The use of refuges may aid in increasing predator diversity, which has been correlated with an increased probability of biological control (Hawkins & Gross 1992), and there is some evidence for this effect in acarine systems of apple orchards (Croft & Slone 1997).

With the predator and prey densities observed in this study, we demonstrated that it was necessary to have a refuge of at least 60% of the tree to restrict *P. ulmi* densities to below economic thresholds, which appears impractical for pest control. However, in some crops refuges from pesticides disturbance do approximate this size. For example, sprays are applied to every alternative row of apples in Pennsylvania, maintaining mite predator populations within the orchard (Hull, Hickey & Kanour 1983). There is increasing evidence that refuges consisting of plants other than the crop (e.g. Corbett & Rosenheim 1996), or as part of the crop (e.g. Thomas, Wratten & Sotherton 1991), can maintain a source of predators for biological control. Further work is needed on the effects of refuge size on other orchard pest species, with their associated predators and parasitoids. The maintenance of predator populations for control of the pest when undisturbed, and their subsequent dispersal onto pesticide-disturbed leaves and trees, are two key factors for controlling phytophagous mite outbreaks that are themselves induced by agricultural practices.

(Lester, P.J., H.M.A. Thistlewood and R. Harmsen. 1998. The effects of refuge size and number on acarine predator-prey dynamics in a pesticide-disturbed apple orchard. *Journal of Applied Ecology*. 35: 329-331.)

Unit 3 - Activities B
Connectors
Answer sheets
(40 min.)

TEXT 3B-1

1. Group the words **highlighted** in the text in the table below according to their meaning. The first one is done for you. (pair work: 5 min.)

Cause-effect	Contrast	Amplification	Exemplification
		therefore	

TEXT 3B-2

2. Fill in the blanks. Choose the appropriate word from the box below. The first one is done for you. (individual work: 10 min.)

After	Although	Because	Instead	Similarly	Then

1	**Then**
2	
3	
4	
5	
6	

TEXT 3B-3

3. Fill in the table below with a suitable word for each number. In some cases, there is more than one possible correct answer. The first one is done for you. (pair work: 10 min.)

1	2	3	4	5
For example OR **For instance**				

TEXT 3B-4

4. Now read the academic text you brought with you to the lesson. If you did not bring one please ask for one. **<u>Highlight</u>** the connectors used in the text. Then compare your answers with your neighbour and discuss briefly the usefulness of using connectors. (15 min.)

Unit 3 - Activities C

(20 min.)

TEXT 3C-1

1. Read the following extract taken from the textbook *The atmosphere* and answer the questions on the answer sheets provided.

Solar and terrestrial radiation

Earth's Motions

Earth has two principal motions – rotation and revolution. *Rotation* is the spinning of Earth about its axis that produces the daily cycle of daylight and darkness. In the following chapter, we will examine the effects that this daily variation in solar heating has on the atmosphere.

The other motion of Earth, *revolution*, refers to its movement in orbit around the Sun. Hundreds of years ago, most people believed that Earth was stationary in space. The reasoning was that, if Earth were moving, people would feel the movement of the wind rushing past them. Today we know that Earth is traveling at nearly 113,000 kilometers per hour in an elliptical orbit about the Sun. Why don't we feel the air rushing past us? The answer is that the atmosphere, bound by gravity to Earth, is carried along at the same speed as Earth.

The distance between Earth and Sun averages about 150 million kilometers. **1. Because** Earth's orbit is not perfectly circular, however, the distance varies during the course of the year. Each year, on about January 3, our planet is 147 million kilometers from the Sun, closer than at any other time. This position is called the *perihelion*. About 6 months later, on July 4, Earth is 152 million kilometers from the Sun, farther away than at any other time. This position is called *aphelion*. **2. Although** Earth is closest to the Sun and **3. thus** receives more energy in January than in July, this difference plays only a minor role in producing seasonal temperature variations. As proof, consider that Earth is closest to the Sun during the cold Northern Hemisphere winter.

The seasons

We know that it is colder in winter than in summer, **4. but** if variations in solar distance do not cause this seasonal temperature change, what does? We adjust to the continuous change in the duration of daylight that occurs throughout the year by planning our outdoor activities accordingly. The gradual but significant change in day length certainly accounts for some of the difference we notice between summer and winter. **5. Furthermore**, a gradual change in the *altitude* of the noon Sun (its angle above the horizon) is quite noticeable. At midsummer, the noon Sun is seen high above the horizon. But as summer gives way to autumn, the noon Sun appears lower in the sky and sunset occurs earlier each evening.

.../...

(cont.)

The seasonal variation in the altitude of the Sun affects the amount of energy received at Earth's surface in two ways. **6. First**, when the Sun is directly overhead (at a 90° angle), the solar rays are most concentrated. The lower the angle, the more spread out and less intense is the solar radiation that reaches the surface. This idea is illustrated in Figure 2-1. You have probably experienced this when using a flashlight. If the beam strikes a surface perpendicularly, a small intense spot is produced. When the flashlight beam strikes the object at an oblique angle, **7. however**, the area illuminated is larger – and dimmer.

8. Second, and of lesser importance, the angle of the Sun determines the thickness of atmosphere that the rays must penetrate (Figure 2-2). **9. When** the Sun is directly overhead, the rays must pass through a thickness of only 1 atmosphere. But rays entering at a 30° angle travel through twice this amount and 5° rays travel through a thickness roughly equal to 11 atmospheres (Table 2-1). The longer the path, the greater is the chance for absorption, reflection, and scattering by the atmosphere, all of which reduce the intensity at the surface. These same effects account for the fact that we cannot look directly at midday Sun, but we can enjoy gazing at a sunset.

(Lutgens, F.K. and Tarbuck, E.J. 1998. *The atmosphere*. 7th edn. London: Prentice-Hall International, Inc: 23-24.)

TEXT 3C-2

2. Read the following passage taken from a parasitology textbook. Select the correct word from the two alternatives given in the text below. Answer on the answer sheets provided.

Parasites of domestic and wild animals

Both domestic and wild animals are subject to a wide variety of parasites that demand the attention of the parasitologists. **1. As a result/ Although** wild animals are usually infected with several species of parasites, they seldom suffer massive deaths, or *epizootics*, because of normal dispersal and territorialism of most species. **2. However/ Similarly**, domesticated animals are usually confined to pastures or pens year after year, often in great numbers, so that parasite eggs, larvae, and cysts become extremely dense in the soil and the burden of adult parasites within each host becomes devastating[1]. **3. Finally/ For example**, the protozoa known as the coccidia thrive under crowded conditions; they may cause up to 100% mortality in poultry flocks, 28% reduction in wool in sheep, and 15% reduction in weight of lambs[7]. In 1965 the U.S. Department of Agriculture estimated the annual loss in the United States as the result of coccidiosis of poultry alone at about $45 million. Many other examples can be given, some of which are discussed later in this book. Agriculturists, **4. nevertheless/ then**, are forced to expend much money and energy in combating the phalanx of parasites that attack their animals. Thanks to the continuing efforts of parasitologists around the world, the identifications and life cycles of most parasites of domestic animals are well known. This knowledge, in turn, exposes weaknesses in the biology of these pests and suggests possible methods of control. **5. Similarly/ On the contrary** studies of biochemistry of organisms continue to suggest modes of action for chemotherapeutic agents.

Less can be done to control parasites of wild animals. **6. Although/ Furthermore** it is true that most wild animals tolerate their parasite burdens fairly well, the animals will succumb when crowded and suffering from malnutrition, just as will domestic animals and humans. **7. In other words/ For example**, the range of the big horn sheep in Colorado has been reduced to a few small areas in the high mountains. The sheep are unable to stray from these areas because of human pressure. **8. Despite /Consequently**, lung-worms have so increased in numbers that in some herds no lambs survive the first year of life. These herds seem destined for quick extinction unless a means for control of the parasites can be found in the near future.

A curious and tragic circumstance has resulted in the destruction of large game animals in Africa in recent years. These animals are heavily infected with species of *Trypanosoma*, a flagellate protozoan of blood. The game animals tolerate infection well **9. but/ because** function as *reservoirs* of infection for domestic animals, which quickly succumb to trypanosomiasis. One means of control employed is the complete destruction of the wild animal reservoirs themselves. **10. However/Hence**, the parasites of these animals are the indirect cause of their death. It is hoped that this parasitological quandary will be solved in time to save the magnificent wild animals.

(Schmidt, G.D. and L.S. Roberts. 1989. *Foundations of parasitology*. 4th edn. St. Louis and Toronto: Times Mirror/ Mosby College Publishing: 4.)

Unit 3 - Activities C
Answer sheets
(20 min.)

TEXT 3C-1

1. Answer the questions below:

You can answer questions 1.1, 1.2, 1.3 and 1.4 either in English or in Portuguese.

1.1 Why does the distance between Earth and Sun vary?

1.2 What are the two reasons why seasonal variation in altitude of the Sun affects the amount of energy received at the Earth's surface?

1.3 Did the **highlighted** words help you in finding the answers to the above questions (1.1 and 1.2)?

1.4 Why do you think the writers have used these words?

1.5 Translate the words <u>highlighted</u> into Portuguese and answer the question in the table. The first one is done for you.

Number	Word	Translation	Did the context help you find out the translation? (Yes/No)
1.	Because	**porque**	
2.	Although		
3.	Thus		
4.	But		
5.	Furthermore		
6.	First		
7.	However		
8.	Second		
9.	When		

TEXT 3C-2

2. Select the correct word from the two alternatives given in the text. Complete the table below. The first one is done for you.

1	**Although**
2	
3	
4	
5	
6	
7	
8	
9	
10	

Unit 4 - Plan
Discourse structuring words

I. Aims

Unit 4 will focus on discourse structuring words (i.e. words which talk about chunks of text) which only make sense within a particular text since they need to be lexicalised with information from the text.

II. Methodology and materials

1. Warm-up: Activities A

- Reading a text with discourse structuring words highlighted and identifying the chunks of text that those discourse structuring words refer to. (S: individual)
- Matching sentences given in two groups. In one of the groups the discourse structuring words are highlighted. (S: individual)

2. Lesson

- Checking the answers to Activities A (key is given). (S/T)
- The unit handout will be distributed and briefly commented on: explaining and discussing the use of discourse structuring words in academic texts. (S/T)

Activities B:

Task 1: Completing sentences taken from books with the appropriate discourse structuring words given in a box. (S: individual)

Task 2. Completing sentences taken from textbooks with the appropriate discourse structuring words. (S: pairs)

Task 3: A text either brought by each participant or given by the teacher[1] will be read paying attention to the use discourse structuring words and identifying the chunks of text that those discourse structuring words refer to. (S: individual or pairs)

3. Follow-up: Activities C

- Reading a text with discourse structuring words highlighted and identifying the chunks of text that those discourse structuring words refer to. (S: individual)
- Matching sentences given in two groups. In one of the groups the discourse structuring words are highlighted. (S: individual)

4. **Answering a short questionnaire** (S: individual)

5. **Homework**

III. Schedule

1. Warm-up: Activities A (20 min.)

2. Lesson
- Explanation and discussion (15 min.)
- **Activities B**:
  Task 1. (10 min.)
  Task 2. (10 min.)
  Task 3. (20 min.)

3. Follow-up: Activities C (20 min.)

4. Short questionnaire (5 min.)

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[1] Bruce, J. 1996. Automated system rapidly identifies and characterizes microorganisms in food. *Food Technology*. 50.1: 77-78.

Unit 4 – Activities A

(20 min.)

TEXT 4A-1

1. Read the text below and answer the question on the answer sheets provided.

Animal health

Good health is the birthright of every animal and it is the duty of the livestock keeper to do everything possible to ensure this. Considerable advances in the control of animal infections have led to the effective elimination of many of the more traditional causes of acute disease and it is no longer necessary to consider disease an inevitable part of a livestock enterprise. **1. This situation** has been achieved by a combination of good hygiene, the appropriate use of vaccines, good medicine therapy, the development of disease-free strains of livestock but above all by improved husbandry and management. **2. These advances** have made it possible to keep animals in much larger groups and more densely housed than hitherto but the results have by no means been a gradual disappearance of infectious and contagious diseases altogether.

On the contrary, a number of complex diseases have emerged, difficult to diagnose and induced by a multiplicity of pathogenic agents. Whilst these may cause an apparent or 'clinical' disease it is more likely that the effect will be less obvious and may only reduce the overall productivity of the livestock by, for example, slowing growth and reducing the food conversion efficiency. Animals may not die or even show any symptoms at all so the farmers may be unaware of what is happening unless they keep very careful records and use them with more than the usual degree of skill. It is also a very common phenomenon that intensive production on a livestock unit may start efficiently and effectively but deteriorate in time so gradually that it is not noticed until the consequences have become very serious and control becomes extremely difficult. The nature of these infections is of especial interest and concern because the environment and housing conditions have a profound effect on their severity. In the field of contagious diseases the new problem of the 'viral strike' is emerging: many apparently new virus diseases, borne by wind or vectors, travel through areas causing some quite devastating effects for a time, especially in the larger livestock units. More virulent and mutating strains of pathogens appear to be produced the larger the 'biological mass' and the more vaccines are used to protect the animals from diseases.

A further major **3. problem** is that of the *metabolic diseases*. These are a group of diseases that are caused intrinsically by the animals being called to produce an end product faster than the body can process its intake of feed. Enormous efforts are made to provide the right nutrients in an easily assimilated form but as the metabolic disease is

…/…

(cont.)

rather different from a deficiency disease, this does not necessarily work. In a way the metabolic diseases are the inevitable outcome of the success in conquering most of the acute virulent diseases together with the advances made in improved genetics, nutrition and housing. **4. These improvements** have led to much increased growth and productivity but the capability of the animals to keep pace with these has outstripped the normal functioning processes (or metabolism) of the body.

An example of this is provided by considering the growth of table chickens. When the industry started intensively it took 13 weeks to produce a bird weighing 2 kg, at a food conversion efficiency of approximately 3:1 (that is, 3 kg of feed to produce 1 kg of liveweight). The hazards in growing the birds at that time were innumerable and were largely related to contagious and infectious diseases. Mortalities were high, often up to 30%, and the diseases played their part in slowing growth and damaging the food conversion efficiency. Now, some 30 years later, the position is quite different. It takes less than half the time for the birds to reach 2 kg, that is about 5 ½ weeks. Mortalities normally average 3-4% and contagious and infectious diseases are controlled largely by good hygiene together with judicious use of vaccines and medicines. But now we have a number of the so-called metabolic or production diseases: for example, birds are affected with excess fatty deposition, causing degeneration of the liver and kidney and heart attacks. The skeletal growth may not keep pace with the rate of muscle development so that locomotor disorders occur, such as twisted, rubbery and broken bones and slipped tendons.

An important **5. factor** influencing the incidence of disease in livestock today is the increasing immaturity of livestock. Improved performance has resulted in animals reaching market weight much earlier, whilst for genetic reason breeding animals are also younger on average than previously. Thus, on a modern livestock farm, there is usually a high proportion of young animals that are in a state of susceptibility to infectious agents whilst they are still developing the ability to resist disease naturally or natural immunity to disease which will normally take place over a prolonged period.

(Sainsbury, D.W.B. 1995. Animal health. In Soffe, R.J. (ed.). 1995. *The agriculture notebook*. 19th edn. Oxford: Blackwell Science: 497-498.)

TEXTS 4A-2

2. Read the **two sets** of 5 sentences below taken from different journal articles and answer the question on the answer sheets provided.

1.	Initially, we washed the combined petroleum ether extracts successively with H_2O saturated Na HCO_3, and saturated NaCl. The neutralized extracts were dried over Na_2So_4 [13] and then passed over a Sep-Pak C-18 cartridge [11, 12].
2.	However, cattle digested the OM [organic matter] (0.749 vs. 0.724, $p < 0.05$ s.e.d. 0.0106) of maize gluten feed better than sheep, but there were no significant differences ($p > 0.05$) between sheep and cattle with any of the other four feeds.
3.	The network of habitat fragments which makes up the 'urban greenways' in cities is valued for recreation by local people, and may also be important for the conservation of biodiversity in the urban environment, both as a stable and as transient habitats.
4.	Stronger evidence for a genetic influence was provided by the variation in the incidence of disease among different families within affected flocks (71). This was further supported by experimental evidence for a variation in the incidence of scrapie among families of sheep after inoculation with SSBP/1 (39).
5.	Dislodged soil particles may roll across the surface (creep), or they may bounce (saltation), dislodging further particles with each impact.

a.	**These results** do not support previous conclusions that sheep digest concentrates better than cattle, but they do suggest that there are differences within specific feeds.
b.	**These findings** led some of those investigating the disease in the 1960s to believe that scrapie was an autosomally recessive inherited condition, which could be transmitted experimentally but which could not be transmitted from an affected animal to an unaffected animal, except by inoculation (71).
c.	**This process** leads to a cascade effect resulting in massive emissions of dust.
d.	**These procedures** resulted in very clean extracts.
e.	There is an additional **theory** that the habitat patches of urban greenways may be important as 'corridors' or 'stepping stones' which facilitate species dispersal and population persistence within the urban matrix and the 'ecological network' is therefore a key part of current ecological planning (Habitat and Species Directive, Brussels 1993; PPG Note 9; Department of the Environment. October 1994).

Unit 4 - Activities A

Answer sheet

(20 min.)

TEXT 4A-1

1. Complete the table below with the chunks of text that the words highlighted in the text refer to. The first one is done for you.

1. This situation	**the effective elimination of many of the more traditional causes of acute disease and it is no longer necessary to consider disease an inevitable part of a livestock enterprise**
2. These advances	
3. problem	
4. These improvements	
5. factor	

TEXTS 4A-2

2. Match up the **two sets** of 5 sentences paying attention to the words highlighted. Each of the sentences **a-e** should follow one of the sentences **1-5**. The first one is done for you.

1	2	3	4	5
d				

Unit 4
Discourse structuring words

Aims

To focus on discourse structuring words or words which talk about chunks of text. Because these words are often used in academic texts and they only make sense within a particular text it is important to recognise them and understand what they refer to.

1. Definition

Discourse structuring words are '**empty**' or '**half-empty**' words (i.e. abstract nouns) because they need to be '**filled out**' with meaning from other words in the text. This means, the reader needs either to look back or to look forward to discover to which words in the text they refer.

2. Purpose

These words help to structure and organise the discourse (i.e. the text).

They are academic words which organise the argument or connect ideas the writer wants to convey. They do not express the subject matter or content of the text itself.

Look at the two sentences below and decide which words can be considered discourse structuring words.

1. 'The reason for these occurrences depends on certain aspects of the problem.'

(Carter, R. and M. McCarthy. 1988. *Vocabulary and language teaching*. London: Longman: 50-51, 206.)

2. 'Many flowering plants (and some ferns) use the support of others to climb high in canopies of vegetation, and so gain access to more light than if they depended on their own supporting tissues. The ability to climb has evolved in many different families, and quite different organs have become modified into climbing structures (Figure 1.11a): they are analogous structures but not homologous. In other plant species the same organ has been modified into quite different structures with quite different roles: they are therefore homologous, although they may not be analogous (Figure 1.11b).

In these examples (there are very many more) we can argue that similar selective forces have acted so that the same property has been acquired from quite different evolutionary starting points.'

(Begon, M., J.L. Harper and C.R. Townsend. 1996. *Ecology: individuals, populations and communities.* 3rd edn. Oxford: Blackwell Science: 23.)

3. Reference

1. to refer back to other words or parts of the text

e.g. 'However their seedlings were not mycorrhizal when introduced into the growth chambers, so the early stage of development of the mycorrhizas themselves may, as indicated above, have consumed any excess of carbon being allocated to fine roots. **In their case**, also, a performed mycelium would act as a sink for carbon before new biomass could be produced. **This situation** contrasts strongly with that in our observation chambers to which seedlings with preformed mycorrhizas were added.'

(Rouhier, H. and D.J. Read. 1998. Plant and fungal responses to elevated atmospheric carbon dioxide in mycorrhizal seedlings of *Pinus sylvestris. Environmental and Experimental Botany.* 40: 245.)

2. to refer forward to words or parts of the text

e.g. 'The values reported herein (2.0 to 2.7 pseudothecia per leaf for nonlimed pear leaves and 2.5 to 3.7 for apple leaves) may be the result of several **factors**, including a high percentage of sterile lesions, poor leaf contact with the ground because of the underlying nylon mesh, and periodically reduced light from fallen leaves and fruit on top of the mesh (13).'

(Spotts, R.A., L.A. Cervantes and F.J.A. Niederholzer. 1997. Effect of dolomitic lime on production of asci and pseudothecia of *Venturia inaequalis* and *V. pirina. Plant Disease.* 81.1: 97.)

Note:

→ Sometimes within the same sentence you can have both cases:

e.g. 'Agroecosystem health management, being both participatory and structured in a looping fashion which mimics the system itself (Fig. 4), does not result in a single definable outcome. [...] The **outcome** of this **approach** is a sustainable web of learning organizations, from farms to communities to global institutions, which are capable of acting, monitoring and adapting in a world characterized by perpetual change.'

(Faye, B., D. Waltner-Toews and J. McDermott. 1999. From 'ecopathology' to 'agrosystems health'. *Preventive Veterinary Medicine*. 39: 123.)

- **outcome**: (refers forward) = a sustainable web of learning organizations
- **approach** (refers backwards) = agroecosystem health management

4. Functions

1. to encapsulate (i.e. express the main points or ideas in a short form) **chunks of text**, that is, to label parts of the preceding text, in order to support the ongoing argument of the text. It makes sentences shorter, clearer and lighter.

e.g. 'As the concentration of dolomitic lime applied to leaves increased, the percentage of leaves with pseudothecia, the number of pseudothecia per leaf, and the number of asci per pseudothecium decreased. **This effect** was observed in both pear (Table 1) and apple (Table 2) leaves in 1994 and 1995.'

(Spotts, R.A., L.A. Cervantes and F.J.A. Niederholzer. 1997. Effect of dolomitic lime on production of asci and pseudothecia of *Venturia inaequalis* and *V. pirina*. *Plant Disease*. 81.1: 96.)

2. to talk about and label what is being said/written

e.g. 'The Poacea have long been assumed to be lacking in significant levels of secondary metabolites. One reason for this **assumption** is the paucity of published studies that document whether grasses contain significant levels of various secondary compounds, and whether such compounds play active roles in ecological processes.'

(Redak, R.A. 1987. Forage quality: secondary chemistry of grasses. In Capinera, J.L. (ed.) 1987. Integrated pest management on rangeland: a shortgrass prairie perspective. Boulder, Colorado: Westview Press: 48.)

3. to link parts of a text in order to align it with the ongoing line of argument

e.g. 'The applicability of the log-normal distribution to wind speed data is a question of importance in using this **procedure** and is examined in greater detail in the next section.'

(Luna, R.E. and H.W. Church. 1974. Estimation of long-term concentrations using a 'universal' wind speed distribution. *Journal of Applied Meteorology*. 13: 913.)

4. Use

1. They can be used alone.

2. They can be used together with evaluating words (i.e. adjectives).

These adjectives instruct us to give more or less weight to particular parts of the text and show the author's views on the subject:

e.g. '**A remarkable** aspect of plant metabolism is that during photosynthesis, plants use CO_2 and water to make a single simple organic compound, 3-phosphoglyceraldehyde.'

(Mauseth, J.D. 1995. *Botany: an introduction to plant biology*. 2nd edn. Philadelphia: Sanders College Publishing: 25.)

e.g. '**A fundamental** issue is what treatment or combination of treatments will rapidly achieve some facsimile of a healthy ponderosa pine ecosystem.'

'**Preliminary** results from our ecosystem restoration work are encouraging. The combination of thinning and burning - the complete restoration treatment - has changed forest structure from fire behavior fuel model 9 (Anderson 1982), in which crown fires are common, to fuel model 2, in which surface fires occur but crown fires are highly improbable.'

(Covington, W.W., P.Z. Fulé, M.M. Moore, S.C. Hart, T.E. Kolb, J.N. Mast, S.S. Sackett and M.R. Wagner. 1997. Restoring ecosystem health in ponderosa pine forests of the Southwest. *Journal of Forestry*. 95.4: 24; 28.)

e.g. 'One of the most **urgent** global problems is finding enough water and land to support the world's food needs.'

(Glenn, E.P., J.J. Brown and J.W.O'Leary. 1998. Irrigating crops with seawater. *Scientific American*. August 1998: 56.)

e.g. 'The spectra of the four continents are strikingly similar. Particularly remarkable is the very close similarity of the ecological diversity spectra for the Australian and Malaysian forests, bearing in mind that the fauna of Australia is marsupial and that of Malaya is placental. This is a **spectacular** confirmation that the parallel evolutionary divergence within marsupial and placental phylogenies has resulted in ecologically matched faunas (see Figures 1.12 a, b).'

(Begon, M., J.L. Harper and C.R. Townsend. 1996. *Ecology: individuals, populations and communities.* 3rd edn. Oxford: Blackwell Science: 34.)

5. This/these + summary noun

One very common way of helping the reader in English academic writing is the use of **this/these + summary noun** to join ideas together. These **summary words** are **discourse structuring words**. Because they express ideas in a very concise way they leave more space for new information, helping to maintain the flow of information in the text.

This (or **these**) is often used in initial sentence position. Thus, the writer tells the reader how the previous sentence is being interpreted (Swales and Feak 1994a, 1994b).

e.g. 'As the roots of willows, sorrel, and other plants spread horizontally, they produce shoot buds that grow out and act as new plants. **This method** of vegetative reproduction is quite similar to that of stoloniferous and rhizomatous plants, except that roots rather than stems are involved.'

(Mauseth, J.D. 1995. *Botany: an introduction to plant biology.* 2nd edn. Philadelphia: Sanders College Publishing: 174.)

e.g. (referring back to the preceding section) '**These changes** mirrored a similar revolution among agronomists who were developing the concepts of farming systems theory (von Bertalanffy, 1970).'

(Faye, B., D. Waltner-Toews and J. McDermott. 1999. From 'ecopathology' to 'agrosystems health'. *Preventive Veterinary Medicine*. 39: 112.)

Table 1: A selection of common discourse structuring nouns used in academic texts.

Structuring vocabulary[1]			
Abstraction	Context	Investigation	Reality
Addition	Decision	Issue	Reason
Advantage	Deduction	Item	Reasoning
Analysis	Difficulty	Justification	Recognition
Answer	Dilemma	Limitation	Reflection
Approach	Disadvantage	Matter	Resolution
Argument	Doubt	Method	Response
Aspect	Effect	Misinterpretation	Result
Assessment	Error	Misjudgement	Role
Assumption	Evaluation	Notion	Scenario
Attitude	Evidence	Objection	Situation
Basis	Examination	Operation	Solution
Belief	Example	Opinion	Speculation
Case	Factor	Outcome	Statement
Cause	Feature	Pattern	Subject
Change	Finding	Perspective	Suggestion
Characteristic	Formula	Picture	Supposition
Circumstances	Formulation	Point	Theory
Claim	Hypothesis	Position	Term
Comparison	Idea	Prediction	Topic
Component	Identification	Problem	View
Composition	Inferences	Procedure	Way
Concept	Innovation	Question	Weakness
Confusion	Insight	Rationalisation	
Consequence	Instance	Reaction	
Consideration	Interpretation	Realisation	

1. Nouns which are used not to express the subject matter of the text itself, but to link the ideas the writer wishes to convey.

(Anderson, K. 1997. *Vocabulary for reading*. Institute of Applied Language Studies. University of Edinburgh)

Further reading:

Swales, J.M. and C.B. Feak. 1994a. *Academic writing for graduate students*. Ann Arbor, Michigan: The University of Michigan Press.

Swales, J.M. and C.B. Feak. 1994b. *Academic writing for graduate students: commentary*. Ann Arbor, Michigan: The University of Michigan Press.

Other references:

Anderson, K. 1997. *Vocabulary for reading*. Institute for Applied Language Studies. University of Edinburgh.

Carter, R. and M. McCarthy. 1988. *Vocabulary and language teaching*. London: Longman: 50-51; 205-209.

Ferguson, G. 1996. Vocabulary in ESP. MSc. Course in Applied Linguistics: Teaching English for Specific Purposes option. Unpublished lecture notes. University of Edinburgh.

Francis, G. 1986. *Anaphoric nouns*. Birmingham: English Language Research, University of Birmingham.

McCarthy, M. 1990. *Vocabulary*. Oxford: Oxford University Press: 50-61.

McCarthy, M. 1991. *Discourse analysis for language teachers*. Cambridge: Cambridge University Press: 74-78.

Winter, E.O. 1978. A look at the role of certain words in information structure. *Informatics*. 3.1: 85-97.

Unit 4 – Activities B
Discourse structuring words
(40 min.)

TEXTS 4B-1

1. Read the sentences below taken from different books and answer the question on the answer sheets provided. (individual work: 10 min.)

1.1 The structure and properties of the outer surface of the virus particle are therefore of vital importance in understanding the process of infection. In general, naked (envelope-free) viruses are resistant and survive well in the outside world; they may also be bile-resistant allowing infection through the alimentary canal. Enveloped viruses are more susceptible to environmental factors such as drying, gastric acidity and bile. These ________ in susceptibility influence the ways in which these viruses can be transmitted.

(Mims, C., J. Playfair, I. Roitt, D. Wakelin and R. Williams. 1998. *Medical microbiology*. 2nd edn. London: Mosby: 19.)

1.2 In the discussion of ecosystems and their functional processes, the biota were considered in terms of functional levels (plants, herbivores, carnivores, and detrivores) rather than in terms of individual organisms. The processes of energy flow and nutrient cycling were also discussed as general ecological phenomena rather than as events in a specific ecosystem. This ________ was used because the principles considered apply equally to all ecosystems.

(Kimmins, J.P. 1996. *Forest ecology: a foundation for sustainable management*. 2nd edn. Upper Saddle River, N.J.: Prentice Hall: 133.)

1.3 The pea and bean scheme was introduced to encourage the production of proteinaceous crops within the EU [European Union] as supplies were well below the self-sufficiency level. The ________ has been an increase in the area of peas and beans grown for animal feed. The scheme provided indirect support for the producer who benefited by receiving at least the minimum purchase price from the compounder.

(Turner, J. and M. Taylor. 1998. *Applied farm management*. 2nd edn. Oxford: Blackwell Science: 227.)

1.4 Impacts of erosion include sedimentation of reservoirs and decline in water quality (Buthcher *et al.*, 1993), and damage to property, principally roads and houses. Many such ________ are not documented but occur regularly in the Isle of Wight, the East and West Midlands, Somerset and Kent (DoE, 1995; Evans, 1996).

(Robinson, M., J. Boardman, R. Evans, K. Heppell, J. Packman and G. Leeks. 2000. Land use change. In Acreman, M. (ed.) 2000. *The hydrology of the UK: a study of change*. London: Routledge: 37.)

1.5 The total amount of precipitation is significant, but it is as important to assess the effect of seasonal rainfall, and whether it accompanies the cool or the warm season. The intensity of the rainfall is also important, as the effect of short, intense downpours can be very different to long periods of gentle drizzle. These ________, as well as the local micro-climate, are important considerations, but unfortunately they are not often recorded.

(Bridges, E.M. 1997. *World soils.* 3rd edn. Cambridge: Cambridge University Press: 20.)

1.6 Pressure groups, emphasizing the facts that pesticides are toxic, that their residues may be present in minute quantities in food, and proposing that, as man-made products, they have no place in the natural world, have heightened suspicions of the real value of intensive crop production systems generally, and the use of pesticides in particular. This ________ has been given impetus by well reported incidents of suspected pesticide misuse, mistakes in assessing residue levels and adverse toxicology.

(Hewitt, H.G. 1998. *Fungicides in crop protection.* Wallingford: CAB International: 49.)

TEXTS 4B-2

2 Read the sentences below taken from different textbooks and answer the question on the answer sheets provided. (pair work: 10 min.)

2.1 This technique works well for most tissues, although some modifications to the general procedure may be necessary to ensure the maximum yield of a particular cell type. One of the major difficulties and reasons for failure at this stage is that the cell population becomes contaminated with bacteria or fungi (Chapter 3). To avoid this ________, it is important to maintain aseptic techniques throughout the process of establishing the primary culture.

(Butler, M. 1996. *Animal cell culture and technology: the basics.* Oxford: IRL Press: 7.)

2.2 Stems are sometimes classified as *woody* or *herbaceous*. These ________ are imprecise, and no clear dividing line can be drawn between them, but they are useful nonetheless. For the purpose of this discussion a herbaceous stem will be defined as one in which no new tissues are formed after extension growth is completed, although existing tissues may or may not become heavily lignified.

(Forbes, J.C. and R.D. Watson. 1992. *Plants in agriculture.* Cambridge: Cambridge University Press: 87.)

2.3 As ecologists we need to ask how timber can be grown and harvested on a long-term basis without depleting the system of nutrients.
To answer that ________ we need to know how much of the essential mineral nutrients are removed at harvest.

(Newman, E.I. 1993. *Applied ecology*. Oxford: Blackwell Science: 139.)

2.4 Calving intervals greater than the ideal are even more serious. Milk yield may remain at higher levels for a longer period while the cow is not pregnant but there will be, nevertheless, a longer period of low or zero milk production. This results in a lower average yield. The rate of production of calves for sale or rearing is also reduced. These two ________ together can lead to an economic loss of at least £3 per cow for each day that the calving interval exceeds 365 days (MAFF, 1984).

(Peters, A.R. and P.J.H. Ball. 1995. *Reproduction in cattle*. 2nd edn. Oxford: Blackwell Science: 199.)

TEXT 4B-3

3 Read the following text taken from a journal article and **highlight/underline** the discourse structuring words. Next, identify the chunks of text that those discourse structuring words refer to. (individual or pair work: 20 min.)

Automated system rapidly identifies and characterizes microorganisms in food

Pathogenic and spoilage microorganisms in food processing environments can cause costly and time-consuming delays in production and processing. Certain contaminants, such as *Salmonella*, *Listeria monocytogenes*, *Escherichia coli*, or *Staphylococcus aureus*, can result in complete shutdown of food production until the source of contamination is identified and eliminated. A premature shutdown based on incomplete or presumptive information may result in lost production; conversely, a delay in pathogen identification may result in an even more costly product recall. Management should not be placed in a position of making a high-risk, high-stake guess. Meaningful, reliable, detailed information is required. Time and accuracy are of the essence.

Standard microbiological techniques, however, can take several days to arrive at a species identification. Traditional methods for bacterial isolation and identification at the species level are based on secondary characteristics of bacteria and can be tedious and time-consuming. These traditional methods may require multiple growth conditions and several days of biochemical testing to arrive at a species identification. Once a conventional analysis has been completed, the results do not necessarily provide the resolution required to identify the source of contamination or infection. Since different strains of the same species exhibit very similar biochemical characteristics, but can often exhibit different degrees of virulence, it is often necessary to continue with a more detailed analysis such as serological tests for more precise characterization. Such testing can lengthen the investigation process by several days to several weeks an unacceptable long time when the business stakes are so high.

During the early 1980s, a variety of molecular techniques were developed at research laboratories for DNA analysis and gene exploration. In the mid-1980s some of these technologies were applied to bacterial analysis. One technique, called ribotyping, evolved for characterization of organisms using restriction fragments of nucleic acids from bacterial genomes (Webster, 1983, 1988; Grimont and Grimont, 1986; Jacques et al., 1992). By hybridizing a ribosomal probe to size-separated DNA restriction fragments, this method can permit accurate and reliable characterization and identification of bacteria.

Although this technology has been used widely in research laboratories, it depends on highly skilled practitioners to achieve meaningful and reliable results. In addition, many investigators have applied this technique to meet their very specific needs, reducing the ability to compare results between laboratories. To address these and other issues in microbiological characterization, the Food Quality Management Systems

.../...

(cont.)

team at the Du-Pont Company developed a fully automated ribotyping system, the RiboPrinter Microbial Characterization System (Fig. 1).

Automated Ribotyping

The system combines many molecular processing steps in a stand-alone, automated ribotyping instrument designed specifically to satisfy the needs of the food industry. Working from an isolated bacterial colony, the system performs all the process steps required to characterize the bacteria to the strain level, from cell lysis to image analysis. When DNA fragments from different bacterial strains, cut with *Eco*RI restriction enzyme, are size-separated and hybridized with a labeled rRNA operon probe, each strain produces a unique fragment pattern. From this fragment pattern data, the system uses a series of proprietary algorithms to generate a RiboPrint pattern, then characterizes, archives, and compares these patterns to a supplied database. This comparison can result in the identification of the organisms of interest at a genus, species, and strain level. The automated system also compares the pattern for each new sample against all the other patterns run on the system to determine similarity. This process allows the system to characterize samples as alike or different even when the tested strain is not part of the identification database. This characterization function is especially useful when investigating new or unusual bacteria.

Because of the importance of accuracy and time in characterizing, identifying and eventually eliminating undesirable organisms for the food industry, this automated system has been designed to reduce the time involved in each step, while eliminating the uncertainties of classical strain characterization/identification. The result is a process that requires 8 hr [hours] to produce reliable results from isolated colonies.

How the System Works

Fig. 2 illustrates the process to prepare and analyze microbiological samples. The following discussion summarizes the steps involved in obtaining a pattern for a microorganism under investigation.

Engineering advances in the equipment and specially manufactured reagents and carriers make it possible to achieve extreme precision in volume and concentration of sample and reagents, yielding a high confidence, reproducible process. [...]

.../...

(cont.)

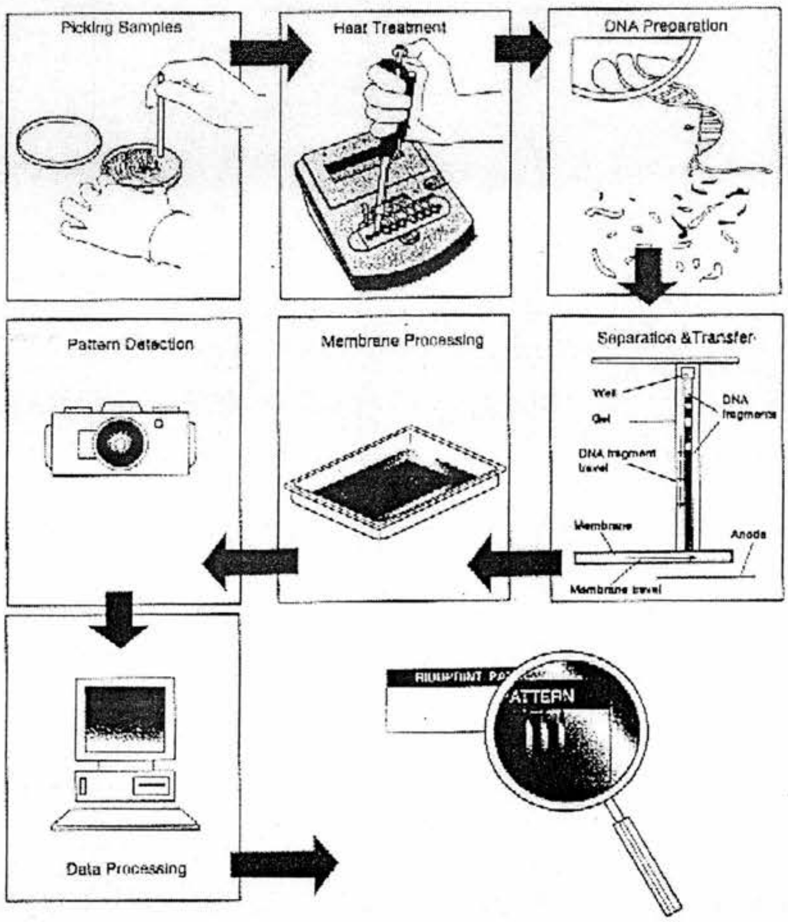

Fig. 2—**Sample Treatment in the Automated System.** *The process moves from manual collection of the sample, through heat treatment in a separate instrument, into the automated instrument for DNA preparation, separation and transfer, membrane processing and data processing, to the production of a unique pattern for each sample.*

(Bruce, J. 1996. Automated system rapidly identifies and characterizes microorganisms in food. *Food Technology*. January 1996: 77-78.)

Unit 4 - Activities B
Answer sheet
(40 min.)

TEXTS 4B-1

1. Use one of the words in the box below to complete each blank in the sentences taken from different textbooks. The first one is done for you. (individual work: 10 min.)

approach	cases	differences	features	result	trend

1.1	**differences**
1.2	
1.3	
1.4	
1.5	
1.6	

TEXTS 4B-2

2. Think of suitable word(s) to complete each blank in the sentences taken from different textbooks that you have just read. The first one is done for you. (pair work: 10 min.)

2.1	**problem**
2.2	
2.3	
2.4	

TEXT 4B-3

3. Read the text you brought to the lesson (if you did not bring a text please ask for one) and **highlight/underline** the discourse structuring words. Next, identify the chunks of text that those discourse structuring words refer to. (individual or pair work: 20 min.)

Unit 4 - Activities C

(20 min.)

TEXT 4C-1

1. Read the text below and answer the question on the answer sheets provided.

Sustainability of forest ecosystem
The problem of human population

Thomas Malthus, an eighteen century English vicar, proposed that humans, like other organisms, are ultimately resource limited. **1. This idea**, which was revolutionary when he proposed it in 1798, led to the ideas of natural selection and the struggle for existence, ideas that were a stimulus for Darwin's work on evolution, as well as much of modern ecology.

Malthus identified human population growth and the resulting resource depletion as one of the ultimate threats to the environment. **2. This theme** has been elaborated in recent times by the Club of Rome in their book *Limits to Growth* (Meadows et al., 1972), by the World Commission on Environment and Development in their report *Our Common Future* (WCED, 1987), and by the United Nations Conference on Environment and Development in 1992 in their report *Agenda 21 – the U. N. action plan on environment and development into the 21st Century.*

Humans currently consume about 4.7 billion m^3 of wood annually from a total world forest growing stock of 340 billion m^3 (Sharma et al., 1992). In spite of intensive afforestation efforts since World War II, plantations supply only about 10% of the world's industrial wood supply. The rest is harvested from native forests. With the anticipated growth in human numbers, the demand for wood is expected to increase to 6.6 billion m^3 by the year 2025, and increase of 40% (Sharma et al., 1992). The difference between population growth and demand growth reflects anticipated lack of supply, recycling of wood products, and product substitution because of scarcity. In contrast to

3. this prediction, increasing recognition of the environmental friendliness of wood products could lead to an increase in their use.

Most of the predicted increase in forest harvesting around the world is driven by human growth. The global average consumption of wood per person is presently about 0.7 m^3 per year. The U. S. average is estimated to be about 2.3 m^3 (Sutton, 1993a, b). With the current population growth this means that wood demand is increasing by about 2 m^3 per

.../...

(cont.)

second, 120 m^3 per minute, 7,000 m^3 every hour, 123, 000 m^3 every day, and nearly 70 million m^3 every year. **4. <u>This estimate</u>** seems reasonable considering that the actual average annual increase in wood harvested over the past 5 years has been about 60 million m^3. Over the next 20 years the global wood demand is expected to increase by an average of 84 million m^3 annually (Anon., 1991), more than the present annual harvest from British Columbia and about half of the total annual timber harvest in Canada. This is especially remarkable since Canada accounts for 10% of the world's forests, 14% of the world's softwoods, and supplies 50% of the world export trade in softwood lumber and 56% of the world trade in newsprint.

Clearly, this rate of increase in forest harvesting cannot continue. In fact, the world is expected by some people to face conditions of timber famine within the next 20 years.
5. <u>This</u> dire **<u>prediction</u>** has been made many times in the past, but has yet to be fulfilled. Exploitation of areas of previously unexploited forest, utilization of tree species previously considered unusable, and technological developments that have permitted the use of ever-smaller trees, and even branches, for both solid wood and wood fiber products, has always been able to satisfy the increasing demand. However, with population growth and global deforestation continuing, and the establishment of new plantations lagging far behind the rate of forest depletion in the developing countries, many people believe that Malthus's original prediction will eventually come true.

To understand the history of human impacts on the world's forest, and the probable future trends in this impact, we need to understand the history of human population increase and the predicted future growth. Unless we grasp the magnitude and consequences of this growth, it is unlikely that we will achieve the United Nations vision of sustainable development, nor will we be successful in devising conservation strategies to ensure that we pass the global environment to future generations in as healthy, diverse, and productive condition (or better) as our generation inherited from the past.

(Kimmins, J.P. 1996. *Forest ecology: a foundation for sustainable management.* Upper Saddle River, N.J.: Prentice Hall: 3-4.)

TEXTS 4C-2

2. Read the **two sets** of 5 sentences below taken from different journal articles and answer the question on the answer sheets provided.

1.	Thus, by day 28 less than 5% of the remaining sugar was present as sucrose, the rest of the sugar being present as glucose and fructose.
2.	Early observations on the occurrence of scrapie in flocks that had previously been free of disease, after the introduction of affected animals, suggested that scrapie could be a contagious disease (64). A contagious disease is defined as a condition caused by an infectious agent, which can be transmitted from infected to uninfected animals.
3.	The large losses arose because, from 1974-76, there was a succession of mild winters (favourable for overwintering of the aphids and the viruses) and springs that gave rise to early invasion of the root crops by viruliferous aphids. Similar conditions did not recur in the 1980s and losses due to virus averaged 2% (Jaggard *et al.* 1998).
4.	Colostrum quality should be estimated before freezing; specific gravity is a common measure and, when done correctly, can adequately estimate overall quality (10, 11, 17, 20). Even when procedures are closely followed, obtaining an adequate amount of frozen colostrum may be difficult.
5.	Transects, randomly located throughout the 2,470-acre seeded area, were used to assess vegetative cover in June of 1994, 1995, 1996 and 1997. Ground cover of the seeded species increased slightly, from 23% in 1994 to about 25% in 1996, similar to typical values in the region, followed by a decrease to about 16% in June 1997.

a.	**This change** from the 1970s to the 1980s is represented by an estimated yield improvement of 0.15 t/ha, which, when added to the improvement due to mildew control, produces the yield increase of 0.27 t/ha featured in Table 2.
b.	**These findings** suggest that it is specifically the presence of sucrose which is inhibitory *in vitro*, rather than the total sugar concentration in the medium.
c.	In **these instances**, the use of an exogenous source of IgG [colostrum, serum, or milk-derived supplement] to supplement colostrum may prove beneficial.
d.	**This decline** was attributed to a 50% reduction in both California buckwheat and Indian ricegrass.
e.	**This theory** was supported by the experimental transmission of infection to sheep in 1936 (10) and to goats in 1939 (11).

Unit 4 - Activities C
Answer sheet
(20 min.)

TEXT 4C-1

1. Complete the table below with the chunks of text that the words **highlighted** in the text refer to. The first one is done for you.

1. This idea	**Humans, like other organisms, are ultimately resource limited**
2. This theme	
3. this prediction	
4. This estimate	
5. This prediction	

TEXT 4C-2

2. Match up the **two sets** of 5 sentences paying attention to the words **highlighted**. Each of the sentences **a-e** should follow one of the sentences **1-5**. The first one is done for you.

1	2	3	4	5
b				

Texts used in 4A-2

1.
Gessner, M.O., M.A. Bauchrowitz and M. Escautier. 1991. Extraction and quantification of ergosterol as a measure of fungal biomass in leaf litter. *Microbial Ecology*. 22: 290.

2.
O'Mara, F.P., J.E. Coyle, M.J. Drennan, P. Young and P.J. Caffrey. 1999. A comparison of some concentrate feed ingredients in cattle and sheep. *Animal Feed Science and Technology*. 81: 167.

3.
Austin, K.C. and P.G. Angold. 2000. Influence of landscape components on species recruitment in cities. *Aspects of Applied Biology 58, Vegetation management in changing landscapes*: 115.

4.
Hoinville, L.J. 1996. A review of the epidemiology of scrapie in sheep. *Revue Scientifique et Technique, Office International des Epizooties*. 15.3: 829-830.

5.
Grantz, D.A., D.L. Vaughn, R.J. Farber, B. Kim, T. VanCuren and R. Campbell. 1998. Wind barriers offer short-term solution to fugitive dust. *California Agriculture*. 52.4: 14.

Texts used in 4C-2

1.
Lees, R.P., E.H. Evans and J.R. Nicholas. 1991. Photosynthesis in *Clematis*, 'The President', during growth *in vitro* and subsequent *in vivo* acclimatization. *Journal of Experimental Botany*. 42.238: 607.

2.
Hoinville, L.J. 1996. A review of the epidemiology of scrapie in sheep. *Revue Scientifique et Technique, Office International des Epizooties*. 15.3: 829.

3.
Scott, R.K. and K.W. Jaggard. 2000. Impact of weather, agronomy and breeding on yields of sugarbeet grown in the UK since 1970. *Journal of Agricultural Science*. 134: 346-347.

4.
Arthington, J.D., M.B. Cattell and J.D. Quigley. 2000. Effect of dietary IgG source (colostrum, serum, or milk-derived supplement) on the efficiency of Ig absorption in newborn Holstein calves. *Journal of Dairy Science.* 83.7: 1463-1464.

5.
Grantz, D.A., D.L. Vaughn, R.J. Farber, B. Kim, T. VanCuren and R. Campbell. 1998. Wind barriers offer short-term solution to fugitive dust. *California Agriculture*. 52.4: 10.

Unit 5 - Plan
Decoding noun chains

I. Aims

Unit 5 will be concerned with decoding noun chains. As they make the discourse more concise and compact their meaning needs to be unpacked. Noun chains in English allow the use of word order which differs from the Portuguese, where noun chains tend to be linked by prepositions.

II. Methodology and materials

1. Warm-up: Activities A

- Reading an abstract with noun chains highlighted and unwinding them. (S: individual)
- Converting phrases into noun chains. (S: individual)
- Translating noun chains into Portuguese. (S: individual)

2. Lesson

- Checking the answers to Activities A (key is given).
- The unit handout will be distributed and briefly commented on: explaining and discussing the use of noun chains in academic texts. (S/T)

Activities B:

Task 1: Reading the introduction of a review and highlighting noun chains. (S: individual)

Task 2. Converting phrases into noun chains. (S: pairs)

Task 3. Translating noun chains into Portuguese. (S: pairs)

Task 4. Reading chapter titles: paraphrasing the highlighted noun chains and identifying the discipline/subject area they come from. (S/T: plenary)

Task 5. A text either brought by each participant or given by the teacher[1] will be read underlining the noun chains and paraphrasing some of them. (S: individual or pairs)

3. Follow-up: Activities C

- Reading an abstract with noun chains highlighted and unwinding them. (S: individual)
- Converting phrases into noun chains. (S: individual)
- Translating noun chains into Portuguese. (S: individual)

4. Answering a short questionnaire (S: individual)

5. Homework

III. Schedule

1. Warm-up: Activities A (20 min.)

2. Lesson
- Explanation and discussion (15 min.)
- **Activities B**:
  Task 1. (10 min.)
  Task 2. (5 min.)
  Task 3. (5 min.)
  Task 4. (10 min.)
  Task 5. (15 min.)

3. Follow-up: Activities C (20 min.)

4. Short questionnaire (5 min.)

[1] Opara, L.U., A.J. Hodson and C.J. Studman. 2000. Stem-end splitting and internal ring-cracking of 'Gala' apples as influenced by orchard management practices. *Journal of Horticultural Science & Biotechnology*. 75.4: 466-467.

Unit 5 – Activities A

(20 min.)

TEXT 5A-1

1. Read the abstract below and answer the questions on the answer sheets provided.

This study compared the impacts of managing **pregnant beef cows** for either **body condition loss or gain** during the last 4 to 5 months of gestation, on neonatal traits and **cow rebreeding performance**. Cows were initially sorted into **high or low body condition score groups**. The high group was managed to lose condition prior to calving (BCS [body condition score] Decrease group), while the low group was managed to gain condition (BCS Increase group).

The Decrease group began the trial with an average BCS of 3.3, losing .54 units of BCS to calve with an average of score of 2.8. Corresponding values (all sig. different) for the Increase group were; initial BCS = 2.7, BCS change = +.40, calving BCS = 3.2.

There were no differences between groups for calving ease, birth weight, **colostrum antibody concentration**, **calf serum antibody level** or **rebreeding pregnancy rate**. Calves born to cows in the BCS Increase group had lower vigour scores and tended to require more time achieve a standing posture than calves in the BCS Decrease group. Time required for calves to initiate suckling was similar in each group.

Correlations were calculated between i) calving BCS ii) BCS change; and the above mentioned traits. **Calf vigour score** and time required for calves to stand were both unfavourably correlated with increased BCS at calving. These two traits were also unfavourably related to an increase in BCS during gestation. As well, increased BCS at calving was unfavourably related to the time required for calves to initiate suckling.

In this experiment, BCS gain during gestation, and higher BCS at calving were associated with poorer performance for several traits related to calf behaviour. Birth weight, calving ease, immunity status, and **cow rebreeding rate**, were not affected.

(Hamilton, T.A. and L.F. Giesen. 1997. The effect of cow condition score change on calving, calf immune status and rebreeding. *Ontario Beef Research Update:* 18.)

2. Convert the phrases given in a table on the answer sheets provided into word chains.

3. Read the two sentences below and answer the question on the answer sheets provided.

The adoption of **integrated crop management systems** is welcomed by the agrochemicals industry.

(Hewitt, H.G. 1998. *Fungicides in crop protection.* Wallingford: CAB International: 214.)

Six commercially available **winter wheat cultivars** were selected which, from previous experience (1) and unpublished work, were known to exhibit a range of tillering capacities.

(Turley, D.B. 1999. Effect of seed rate on tillering and yield of wheat cultivars. *Tests of Agrochemicals and Cultivars.* 20. (*Annals of Applied Biology.* 134 Supplement): 64.)

Unit 5 - Activities A
Answer sheets
(20 min.)

TEXT 5A-1

1. Unwind (i.e. paraphrase) the **highlighted** word chains by rewriting them. The first two are done for you.

Word chains	Paraphrase
pregnant beef cows	**cows for beef production which are pregnant**
body condition loss or gain	**loss or gain in the condition of the body**
cow rebreeding performance	
high or low body condition score groups	
colostrum antibody concentration	
calf serum antibody level	
rebreeding pregnancy rate	
calf vigour score	
cow rebreeding rate	

2. Convert the phrases given in the table below into word chains as in the example.

e.g. the rates at which money is changed in the market = **money market rates**

Phrases	Word chains
Composition of species of plants	
System for handling fruits	
Schemes for the accreditation of the levels of herds	
Market of the processing of oil	
Trials in the field for the disruption of mating	
Culture of cells belonging to animals	

3. Translate into Portuguese the word chains which are **highlighted** in the two sentences.

English	**Portuguese**
integrated crop management systems	
winter wheat cultivars	

Unit 5
Decoding noun chains

Aims

Unit 5 will be concerned with understanding groups of nouns (i.e. noun chains) which have a particular meaning. These groups of nouns make the understanding of academic texts more difficult because:

- they make the discourse more concise and compact;
- the word order in English noun chains is different to Portuguese word order.

1. Definition

Noun chains[1] consist of two or more juxtaposed nouns.

2. Functions

- To refer to something that is seen as a **single entity**, as an item in a class of its own.

e.g. enzyme-linked immunosorbent assay

- To give a fixed expression **scientific meaning**, which the individual words do not have.

e.g. 'Esterase activity was determined by using a <u>ScanRDI solid-phase cytometer</u>.'

(Lisle, J.T., S.C. Broadway, A.M. Prescott, B.H. Pyle, C. Fricker and G.A McFeteres. 1998. Effects of starvation on physiological activity and chlorine disinfection resistance in *Escherichia coli* O157:H7. *Applied and Environmental Microbiology*. December: 4659.)

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[1] Here noun chains are used to refer to both noun chains (i.e. strings of nouns) and complex noun phrases (i.e. strings of nouns and adjectives).

- To allow expression of one or more ideas in a **compact and dense form**. They may be used when a group of concepts is referred to for the 2nd or 3rd time. This means that when an idea or concept is presented for the 1st time, it may be referred to in a full form. When it is mentioned again, the writer may choose to compress the idea.

e.g. The study of how quickly cracks in glass grow has made significant progress recently....

⇓ (later in the text)

The rate of crack growth depends not only on the chemical environment but also on the magnitude of the applied stress.

(adapted from Halliday 1993: 97 and Ferguson 1996.)

- To satisfy the inherent **principle of economy** in scientific and technical writing, i.e. noun chains often prove more economical than the corresponding phrases which would use many function words (e.g. prepositions).

e.g. 'Samples were incubated at room temperature for 4 h [hours] before they were filtered onto black polycarbonate membrane filters.' (= filters made of a black membrane of polycarbonate)

(Lisle, J.T., S.C. Broadway, A.M. Prescott, B.H. Pyle, C. Fricker and G.A. McFeteres. 1998. Effects of starvation on physiological activity and chlorine disinfection resistance in *Escherichia coli* O157:H7. *Applied and Environmental Microbiology*. December: 4658.)

- To allow variety in clause position. They can be **used more easily in different positions within the clause** (sentence) than their corresponding fuller form. For example, they may be used at the beginning of a sentence.

e.g. 'The entire-tree mite analysis from all samples prior to straying indicated no significant differences for any mite species among trees with different intended refuge number or size treatments (Table 2).'

(Lester, P.J., H.M.A. Thistlewood and R. Harmsen. 1998. The effects of refuge size and number on acarine predator-prey dynamics in a pesticide-disturbed apple orchard. *Journal of Applied Ecology*. 35: 326.)

3. Complexity

They account for some of the complexity in academic writing. In other words, the text becomes complex because it is dense and words are packed together, but the structure of the sentence is often rather simple. See the two examples below – the first sentence of a journal article abstract and a sentence in an agriculture journal article:

e.g. '**Phospholipid fatty acid (PLFA) profiles** were measured in soils from **organic, low-input**, and **conventional farming systems** that are part of the **long term Sustainable Agriculture farming Systems (SAFS) Project**.'

(Bossio, D.A., K.M. Scow, N. Gunapala and K. Graham. 1998. Determinants of soil microbial communities: effects of agricultural management, season, and soil type on phospholipid fatty acid profiles. *Microbial Ecology*. 36: 1.)

e.g. 'For example, the **Sierra Nevada Ecosystem Project** (NEP 1996) is a **comprehensive, multimillion-dollar regional assessment** of the **state's defining mountain range**.'

(Allen-Diaz, B. 2000. Biodiversity is critical to future health of California's ecology and economy. *California Agriculture*. 54.2: 32.)

4. Differences between English and Portuguese

Noun chains are very frequent in English scientific and technical texts. Usually, the more specialised the text is, the more likely it will be to find noun chains which may be longer than usual. However, noun chains also exist in everyday speech (e.g. short-term treatment). In contrast, Portuguese would usually use:

- different prepositions to convey the same meaning

e.g. protein-deficient diet - dieta deficiente **em** proteínas
long-run growth prospects - perspectivas **de** crescimento **a** longo prazo
economic incentive pollution control instruments - instrumentos **de** controlo **de** poluição baseados em incentivos económicos

- relative clauses to convey the same meaning

e.g. spring calving Holstein Friesian dairy cows - vacas leiteiras Holstein Frísias **que** parem na primavera (ou cujos partos ocorrem na primavera)

Even in the cases where there is a similar noun chain in Portuguese the order would be the reverse:

e.g. agricultural systems - sistemas agrícolas
Holstein Friesian dairy cows - vacas leiteiras Holstein Frísias
marginal net private benefit curve - curva dos benefícios (líquidos) marginais privados (líquidos)

Thus, they may present a problem to Portuguese readers for three reasons:

1. they are not very common in Portuguese;
2. sometimes it is difficult to find a literal translation or to turn them into simple phrases;
3. they take the singular in the 'middle' whereas the unwound expression could have plural.

e.g. safe minim standards - padrões mínimos de segurança
natural resources management policy - política de gestão de recursos naturais

5. Interpretation

The word in far right position (i.e. at the end of the phrase) is usually the most important word (head noun). Thus, the best way to unwind/undo the noun chain is to start at the end.

e.g. 'self-supporting plant stems' = stems of plants which support themselves

(Niklas, K.L. 1997. Mechanical properties of black locust (*Robinia pseudoacacia*) wood: correlation among elastic and rupture moduli, proportional limit, and tissue density and specific gravity. *Annals of Botany*. 79: 479.)

'dark sweet cherry skin color' = the color of the skin of the dark sweet cherry

(Timm, E.J., D.E. Guyer, G.K. Brown and N.L. Schulte. 1995. Michigan sweet cherry color measurement and prototype color chip development. *Applied Engineering in Agriculture*. 11.3: 403.)

It is also useful to rely on the knowledge you already have of the subject since in scientific and technical writing noun chains are used for specialists and therefore a detailed knowledge of the subject may be required to understand them.

6. Hyphens

They can help in the interpretation/clarification of the meaning.

e.g. 'Cells were cultured in 24-well plates.'

24-well plates = plates containing 24 wells

24 well plates = 24 plates containing an unspecified number of wells

rapid-release mechanism = a mechanism which produces a rapid release (i.e., very quick release)

rapid release mechanism = a mechanism that releases many times in a short period

artificial-heart valve = a valve in or for an artificial heart

artificial heart valve = an artificial valve in or for a real heart

(Swales and Feak 1994a: 167; 1994b: 92-93)

7. Compounds

- A **compound** is a unit consisting of two or more bases (i.e. word roots).

- **Orthographic criteria**:

solid - e.g. greenhouse

hyphenated - e.g. environment-friendly

open - e.g. reading material

- **Open compounds** are in fact noun chains.

Compounds		
Two words	**Three words**	**Four words**
spreadsheet (computer) side effects serosurveys bloodstream immunosuppression pathogen-free thermotolerance evapotranspiration clonebanks topsoil	proton magnetic resonance cerise-type variety differential scanning calorimetry broad-leaved forest ground water flow membrane-filtering technique fresh surface water nursery-grown seedlings brown plant hopper (name of a pest) insecticide-producing plants	enzyme-linked immunosorbent assay (ELISA) transgenic disease-resistant plants surface-to-volume ratio vacuum-pressure impregnation techniques

- **Function**

Compounds are very frequent in written scientific and technical texts and exist both in everyday speech and in technical and scientific speech. It should be noted that new words in science are often compounds.

- **Two different spellings**

Sometimes the same compound can be written in different ways:

e.g. proof-reading
or
proofreading

References:

Ferguson, G. 1996. Noun compounds. MSc. Course in Applied Linguistics: Teaching English for Specific Purposes option. Unpublished lecture notes. University of Edinburgh.

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Salager, F. 1984. Compound nominal phrases in scientific-technical literature: proportion and rationale. In Pugh, A.K., J.M. Ulijn (eds.) *Reading for professional purposes: studies and practices in native and foreign languages*. London: Heinemann Educational Books: 136-145.

Swales, J.M. and C.B. Feak. 1994a. *Academic writing for graduate students*. Ann Arbor, Michigan: The University of Michigan Press.

Swales, J.M. and C.B. Feak. 1994b. *Academic writing for graduate students: commentary*. Ann Arbor, Michigan: The University of Michigan Press.

William, R. 1984. A cognitive approach to English nominal compounds. In Pugh, A.K. and J.M. Ulijn (eds.) *Reading for professional purposes: studies and practices in native and foreign languages*. London: Heinemann Educational Books: 146-153.

Unit 5 - Activities B

Answer sheets

(45 min.)

TEXT 5B-1

1. Read the introduction of a review entitled 'New developments in rapid methods for food microbiology' and **highlight** the noun chains in the text which have three or more words. (individual work: 10 min.)

The development of rapid methods and automation in microbiology is a dynamic area, involving the utilization of microbiological, chemical, biochemical, biophysical and immunological methods to improve the isolation, early detection, enumeration and characterization of microorganisms and their products in clinical, food, industrial and environmental samples. During the past 5-10 years, food microbiologists have started to adapt rapid and automated methods for use in their laboratories.

General review articles on this subject have been published by Fung and Cox[1], Cox *et al.*[2], Fung[3,4], Fung *et al.*[5-7] and Hartman *et al.*[8] Specific areas of interest include the improvement of sampling and sample preparation techniques (e.g. development of the stomacher instrument[9,10], the gravimeter diluter[11], and the surface sampling method[12]), and the improvement of conventional microbial detection procedures, which has been brought about by the development of 'miniaturized' methods for the detection of bacteria[13-15] and yeasts and molds[16-18], and by the use of organic dye culture media[19-25]. A number of diagnostic kits (e.g. 'Enterotube', 'Minitek', 'Spectrum 10' and 'MicroID') have been commercialized as a result of such developments[2,26]. Many new methods for the enumeration of microorganisms have been based on modifications of the viable cell count procedure (e.g. the spiral plating system, the 'Isogid', 'Petrifilm' and 'Redigel' systems[5,27-30] and the 'DEFT' – Direct epifluorescence filtrate technique – test[30], while novel techniques for the estimation of microbial populations have been developed based on radiometry, microcalorimetry, reflectance colorimetry, the measurement of ATP metabolism, and the *Limulus* amoebocyte lysate test[4,31]. Some very sophisticated instruments and procedures for microbial identification have been introduced[3,4], exploiting a number of experimental techniques, including ELISAs (enzyme-linked immunosorbent assays) protein profiling, bacterial ice nucleation tests, the polymerase chain reaction (PCR), and the use of DNA/RNA probes and magnetic beads; commercial kits for the rapid detection and identification of microbes include 'Vitek', 'Sensitritre' and the '1-2 test'.

The purpose of this article is to describe a selection of some of the newer types of methods and instruments for the rapid enumeration and characterization of foodborne microorganisms that have been developed or tested in the author's laboratory and that may be adapted for use in other laboratories or applications.

(Fung, D.Y.U. 1992. New developments in rapid methods for food microbiology. *Trends in Food Science and Technology*. 3: 142.)

2. Convert the following phrases or sentences into noun chains as in the example. (pair work: 5 min.)

e.g. a programme of research into cystic fibrosis = **cystic fibrosis research programme**

Phrase or sentence	Noun chain
the values of the coefficient which are linear and fit best	
the distribution of the speed of the wind	
the relation which was shown previously	
planning for the conservation of soil	
data about the speed of the wind	

3. Translate the following noun chains into Portuguese. (pair work: 5 min.)

English	Portuguese
field-packed fruit	
percentage seedling establishment data	
harvesting and delivery approach	
wool growth rate	
coriander seed production	

4. Read the following chapter titles taken from different books. Pay attention to the highlighted noun chains. Paraphrase (i.e. unwind) them and say what discipline/subject area they come from as in the example. (plenary: 10 min.)

e.g. **Rice production constraints** in China
Paraphrase: the constraints of producing (of the production) of rice
Discipline: grasses or cereals

Chapter titles	Paraphrase of noun chains	subject area or discipline
1. Factors of **soil formation**		
2. **Pig health indicators** and **health schemes**		
3. **Weed management systems**		
4. A framework for analysing **hill irrigation activities**		
5. **Plant cell biotechnology**		
6. **Male goat fertility** and **breeding activities**		
7. **Climate impact assessment: climate change**		
8. **River water quality**		

Text 5B-5

5. Read the text you brought to the lesson (if you did not bring a text please ask for one) and **highlight/underline** the noun chains and try to paraphrase a few. (15 min.)

Text 5B-5

5. Read the following Results section and **highlight/underline** the noun chains and try to paraphrase a few. (15 min.)

RESULTS

Incidence of stem-end splitting and ring-cracking

Of the three orchard management factors (irrigation, crop density and nitrogen), only irrigation significantly affected stem-end splitting and ring-cracking significantly (frequent > none; $P \leq 0.05$) (Table I). Frequently irrigated trees produced approximately twice as many split and ring-cracked fruit as non-irrigated trees. Low crop density moderately increased fruit splitting, whereas nitrogen fertilizer had no effect on both SES [stem-end splitting] and IRC [internal ring-crack] in different trees or blocks with the same treatment, and even on branches on the same tree, varied greatly. The variability in fruit split incidence in the irrigated treatment ranged from 0.7 to 28% for single tree_replicates (Table II). Total split fruit increased significantly ($P \leq 0.001$) from 5.9% on the first commercial harvest date to approximately 27% during the third commercial harvest.

Table I

Effects of orchard management practices on the incidence of fruit with stem-end splitting and internal ring-cracking of 'Gala' apples. Data are presented as means of percentage data after angular transformation (radians) and figures are back transformed means (%).
SED = standard error of the mean difference

Management practices	Split fruit n = 11,511	Ring-cracked fruit n = 2,080
Irrigation		
Frequent	19.52 (11.17)	23.95 (16.49)
None	12.86 (4.95)*	17.02 (8.57)*
SED	(2.05)	(1.73)
Fertilizer		
Nitrogen	16.61 (8.17)	20.00 (11.70)
None	16.38 (7.95)	21.44 (13.36)
SED	(2.34)	(2.22)
Crop density		
High	15.05 (6.74)	20.02 (11.71)
Low	17.84 (9.39)	21.42 (13.34)
SED	(2.29)	(2.23)

Levels of treatment means followed by * are significantly different at $p<0.05$.

.../...

(cont.)

Fruit nutrient contents

Analysis for the major nutrients (N, P, K, Ca and Mg) showed that none of the treatments had a significant effect on fruit nutrient concentration (data not shown). On the other hand, both stem-end split fruit and ring-cracked fruit had significantly higher concentrations of P, K and Ca than good fruit, with no significant difference in the concentrations of N and Mg (Table III).

Table II

Variability in stem-end splitting and internal ring-cracking incidence across all crop load and nitrogen treatments expressed by the minimum and maximum values for single tree replicates (sample size = 120 for both stem-end splitting and ring-cracking)

Type of cracking	Irrigation level	Minimum (%)	Maximum (%)	Mean[y] (%)
Stem-end split	Frequent	2.58	28.02	8.1±1.2
	None	0.66	17.27	
Ring-cracked	Frequent	8.47	25.71	12.5±1.1
	None	1.54	20.34	

[y]Percentage mean = SE.

Table III

Major nutrient concentration (mg per 100 g fresh weight) in good, ring-cracked and stem-end split fruit of 'Gala' apple (n = 20 for each type of fruit)

Nutrient	Type of fruit: Good	Ring-cracked	Stem end split	Significance level
N	31.3	28.9	30.5	n.s.
P	7.1b	8.2b	8.0a	0.01
K	100.5b	106.8a	105.1a	0.05
Ca	3.4c	3.9b	4.3a	0.01
Mg	3.2	3.5	3.2	n.s.

(Opara, L.U., A.J. Hodson and C.J. Studman. 2000. Stem-end splitting and internal ring-cracking of 'Gala' apples as influenced by orchard management practices. *Journal of Horticultural Science & Biotechnology*. 75.4: 466-467.)

Unit 5 - Activities C

(20 min.)

TEXT 5C-1

1. Read the abstract below and answer the questions on the answer sheets provided.

This study was designed to compare the absortive efficiency of IgG from a **commercial bovine serum product** (bovine serum), cow colostrum (positive control), and two **commercial milk-derived IgG supplements** (supplement 1 and supplement 2). **Newborn Holstein calves**, collected at birth and prior to the consumption of colostrum, were allotted to treatment by alternating birth order. **Colostrum supplement treatments** were fed according to manufacturer's recommendations at birth and again at 12 h [hours]. This strategy resulted in varying masses of total IgG being offered to the calves (200, 90, 50, and 60 g of IgG for colostrum, bovine serum, supplement 1, and supplement 2, respectively). Blood samples were collected at 0, 12, and 24 h after the end of treatment administration. Plasma volume was estimated as 9.10% of birth weight. Apparent efficiency of IgG absorption at 24 h was determined. Plasma IgG concentrations at 24 h differed for each treatment (12.1, 6.8, 2.2, and 3.5 g of IgG/L for colostrum, bovine serum, supplement 1, and supplement 2, respectively). Apparent efficiency of IgG absorption was greatest for bovine serum compared with colostrum and supplement 1. No treatment differences were detected on the occurrence of mortality. However, calves fed bovine serum tended to have fewer treatments for illness compared with calves fed colostrum and supplement 1. Calves receiving **bovine serum-derived IgG** had **improved IgG absorption efficiency** and a tendency toward fewer medical treatments compared with calves consuming colostrum or a **dried colostrum product**.

(**Key words**: immunoglobulin, colostrum, colostrum replacer, calves)

(Arthington, J.D., M.B. Cattell and J.D. Quigley. 2000. Effect of dietary IgG source (colostrum, serum, or milk-derived supplement) on the efficiency of Ig absorption in newborn Holstein calves. *Journal of Dairy Science*. 83.7: 1463.)

2. Convert the phrases given in a table on the answer sheets provided into noun chains.

3. Read the two sentences below and answer the question on the answer sheets provided.

Crop health management issues can be studied at different time and spatial scales.

(Rossing, W.A.H., W. van der Werf and R. Rabbinge. 1997. Systems research in support of crop and plant health: the role of production ecology. *Agricultural Systems & Information Technology*. 7.1: 6.)

Pesticides, synonymous with agrochemicals or crop protection agents, comprise mainly herbicides, insecticides, fungicides and **plant growth regulators**.

(Hewitt, H.G. 1998. *Fungicides in crop protection*. Wallingford: CAB International: 10.)

Unit 5 - Activities C
Answer sheets
(20 min.)

TEXT 5C-1

1. Unwind (i.e. paraphrase) the highlighted noun chains by rewriting them in full as in the example.

e.g. cow body condition = **the condition of the body of cows**

Noun chains	Paraphrase
commercial bovine serum product	
commercial milk-derived IgG supplements	
newborn Holstein calves	
colostrum supplement treatments	
bovine serum-derived IgG	
improved IgG absorption efficiency	
dried colostrum product	

2. *Convert the phrases given in the table below into noun chains as in the example.*

e.g. the rates at which money is changed in the market = **money market rates**

Phrases	Word chains
Population of plants of ryegrass	
Procedure for the extraction which is the standard one	
Practices of cultivation of seedbeds	
Industry for growing grapes	
Change in the use of land	
Operations of livestock which are corporate and large-scale	

3. Translate into Portuguese the noun chains which are highlighted in the two sentences.

English	Portuguese
crop health management issues	
plant growth regulators	

Unit 6 - Plan
Nominal style

I. Aims

Unit 6 will concentrate on nominal style since it is considered characteristic of scientific and technical style. Similarly to noun chains/complex noun phrases, it can be an economical way of packaging information. Nominalisation increases the degree of language complexity and abstraction and, consequently, texts become more lexically dense. This nominal style, by enabling the package of complex processes into a single constituent either at the beginning or at the end of a clause, may cause comprehension problems.

II. Methodology and materials

1. Warm-up: Activities A

- Reading two versions of an abstract (one in nominal and another in verbal style) and ticking boxes on the differences between the two versions. (S: individual)
- Reading three subheadings taken from a textbook, deciding which verb they come from and paraphrasing the subheadings. (S: individual)
- Choosing the appropriate title (given in a box) for three short subsections taken from books and textbooks. (S: individual)

2. Lesson

- Checking the answers to Activities A (key is given). (S/T)
- The unit handout will be distributed and briefly commented on: explaining and discussing the use of nominalisation in academic texts. (S/T)

Activities B:

Task 1: Completing sentences with the appropriate nominalisation. Words will be given in a box. (S: individual)

Task 2: Completing sentences with the appropriate nominalisation. Words are not given. (S: pairs)

Task 3: Matching definitions with the corresponding nominalisations. (S: plenary)

Task 4: Rewriting sentences in a more nominal style. (S: pairs)

Task 5: A text either brought by each participant or given by the teacher[1] will be read bearing in mind the use of nominal style. Underlining nominalisations and discussing their use with another participant. (S: individual or pairs)

3. Follow-up: Activities C

- Reading two versions of an abstract (one in nominal and another in verbal style) and ticking boxes on the differences between the two versions. (S: individual)
- Reading three subheadings taken from a textbook, deciding from which verb they come from and paraphrasing the subheadings. (S: individual)
- Choosing the appropriate title (given in a box) for three short subsections taken from books and textbooks. (S: individual)

4. Answering a short questionnaire (S: individual)

5. Homework

III. Schedule

1. Warm-up: Activities A (20 min.)

2. Lesson

- Explanation and discussion (15 min.)
- **Activities B**:
  Task 1. (5 min.)
  Task 2. (5 min.)
  Task 3. (5 min.)
  Task 4. (15 min.)
  Task 5. (15 min.)

3. Follow-up: Activities C (20 min.)

4. Short questionnaire (5 min.)

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[1] Rouhier, H. and D.J. Read. 1998. The role of mycorrhiza in determining the response of *Plantago lanceolata* to CO_2 enrichment. *New Phytologist*. 139: 367-368.

Unit 6 - Activities A

(20 min.)

TEXTS 6A-1

1. Read the two versions of the abstract (**A** and **B**) below and complete the tasks on the answer sheets provided. One of the versions is the original text and the other has been adapted.

VERSION A

Abstract

Incipient preharvest sprouting of hard red wheat (*Triticum aestivum* L.) after frequent or prolonged rainfall may decrease seed quality without greatly altering seed appearance. Seeds damaged by preharvest sprouting may or may not be suitable for planting. This study was conducted to evaluate quality and field performance of 25 seed lots of 10 cultivars affected by preharvest sprouting. Sprouting level was measured by falling number; seed quality by test weight, seed weight, protein content, and germination; seed performance by germination after accelerated ageing and seedling emergence from different planting depths; and field performance by seedling emergence and grain yield. Mean falling numbers decreased from 393 in sound seed lots to 268 in slightly sprouted seed lots and 107 in highly sprouted seed lots. Sprouting was highly correlated with reduced germination before and after accelerated ageing, increased protein, and reduced emergence from deep planting, but not with field emergence or grain yield. It was concluded that wheat seed that has suffered incipient sprouting but is otherwise sound can be used for planting during the year that it is harvested, but caution is advised if conditions for stand establishment are unfavourable or the seed has been stored.

Additional index words: germination, seed storage, seedling emergence, stand establishment.

VERSION B

Abstract

When it rains frequently or for a long time, hard red wheat (*Triticum aestivum* L.) sprouts in an incipient way before it is harvested. Although this may decrease seed quality, it does not seem to greatly alter the number of seeds which appear. This study was conducted to evaluate how the quality and field performance of seeds, which sprout before they are harvested, can be affected. In order to carry out the experiment we used 10 hard red wheat cultivars grouped in 25 seed lots. We measured the sprouting level by the number of seeds which fell. We measured seed quality by test weight, seed weight, protein content, and the number of seeds which germinated. We also measured seed performance by the seeds that germinated after the process of ageing was accelerated and we measured seedling performance by observing how seeds which had been planted at different depths emerged. Finally, field performance was measured by the number of seedlings that emerged and the grain the plants yielded. The number mean of seeds falling decreased from 393 in sound soil lots to 268 in slightly sprouted seed lots and 107 in highly sprouted seed lots. Sprouting correlated highly with a low number of seeds which germinated before and after the process of ageing was accelerated, an increase in protein content, and a low number of seeds which emerged from deep planting. On the contrary, sprouting did not correlate highly with the number of seedlings that emerged and the grain the plants yielded. It was concluded that wheat seed that has sprouted in an incipient way but is otherwise sound can be used for planting during the year it is harvested. But farmers are advised to be careful if conditions to establish stands are unfavourable or the seed has been stored.

Additional index words: germination, seed storage, seedling emergence, stand establishment.

(Foster, N.R., L.A. Burchett and G.M. Paulsen. 1998. Seed quality of hard red wheat after incipient preharvest sprouting. *Journal of Applied Seed Production*. 16: 87.)

2. Read the three subheadings taken from the textbook *Practical skills in environmental science* paying attention to the nouns **highlighted**. Then complete the tasks on the answer sheets provided.

Repetition of experiments

Care and **maintenance** of your microscope

Practical aspects of graphic **drawing**

(Jones, A., R. Duck, R. Reed and J. Weyers. 2000. *Practical skills in environmental science*. Harlow: Prentice Hall: 60; 120; 194.)

TEXTS 6A-3

3. Read the three passages below and answer the question on the answer sheets provided.

A

Title: __1__

Chemicals are supplied in various degrees of purity and this is always stated on the manufacturer's containers. Suppliers differ in the names given to the grades and there is no conformity in purity standards. Very pure chemicals cost more, sometimes a lot more, and should only be used if the situation demands. If you need to order a chemical, your Department will have a defined procedure for doing this.

(Jones, A., R. Duck, R. Reed and J. Weyers. 2000. *Practical skills in environmental science*. Harlow: Prentice Hall: 13.)

B

Title: __2__

The failure of a cow to breed can be due either to mismanagement or some physiological disorder, possibly attributable to mismanagement or to infectious disease. This section deals with physiological disorders. [...] The majority of herds are not managed this well and unsatisfactory calving interval, in excess to 390 days, can usually be improved by attention to the relatively simple matter of heat detection and timing of insemination. Nevertheless there is a great deal that can go wrong with the reproductive tract of an individual cow.

(Webster, J. 1993. *Understanding the dairy cow*. Oxford: Blackwell Science: 324.)

C

Title: pH__3__

There are many types of test kits and pH meters available for field and laboratory use. Meters are recommended. Those designed for field operation tend to have more robust probes but care must be taken not to damage them. In the field, they can be deployed in collected water samples (e.g. from specific depths in a lake) or directly into the water (e.g. the surface water of a lake). The general procedure for measuring pH is as follows:

1. Remove the protective cap from the probe.
2. Immerse the probe in the water (typically 2-3cm).
3. Press the 'on' button.
4. Wait for the reading to stabilize; this may take c. 10-20 seconds.
5. Record the reading to the nearest 0.1 unit.
6. Repeat steps 2-5 for a second and third replicate.
7. Average the three pH readings and record to the nearest 0.1 unit.
8. Rinse the probe with distilled water from a wash bottle.
9. Replace the cap on the probe.

(Jones, A., R. Duck, R. Reed and J. Weyers. 2000. *Practical skills in environmental science*. Harlow: Prentice Hall: 170-171.)

Unit 6- Activities A
Answer sheet
(20 min.)

TEXTS 6A-1

1. Tick (✓) the appropriate box.

Questions	A	B
1.1 Which version do you consider easier to understand?		
1.2 Which version do you think is written in a more academic style?		
1.3 Which one do you think is the original version?		

2. Answer the questions below.

2.1 Which verb does the **highlighted** noun come from? Complete the table below. The first one is done for you.

Subheading	Verb
Repetition of experiments	repeat
Care and **maintenance** of your microscope	
Practical aspects of graphic **drawing**	

2.2 Explain briefly in your own words (i.e. paraphrase) the process to which each subheading refers. You can answer either in English or in Portuguese. Answer overleaf.

TEXTS 6A-3

3. Choose the most appropriate title or word to complete the title from the box below. Write your answer in the table below. The first one is done for you.

determinations	infertility	selection

Text	Word
A	selection
B	
C	

Unit 6
Nominal style

Aims

To focus on a particular writing style, often used in scientific and technical texts, in which nouns are used instead of verbs to refer to abstract concepts, processes and actions. This way of writing is called 'nominal style' and it may cause you some comprehension problems. Thus, the main reasons for paying attention to nominal style are the following:

- it makes language more complex and therefore we need to give it more careful attention;
- it makes texts more abstract and therefore texts become more difficult;
- it makes texts more dense because it is possible to express very complex ideas in a few words.

1. Definitions

Nominal style refers to writing in which a great quantity of nouns are used, especially abstract nouns, which increases **abstraction**. Many of these nouns are **nominalisations**. Thus, we can speak of a nominal style in writing, which is abstract and more formal and/or technical.

Nominalisation refers to nouns derived from verbs or adjectives that often represent processes or abstract ideas (see Table 1).

Many nominalisations in English end with syllables like **-tion**, **-ness**, **-ment**, **-ence**, and **-ity**. But some nominalisations are spelt like the verb (e.g. *decrease, decline*).

Table 1: Some examples of nominalisations.

Verb	Nominalisation	Adjective	Nominalisation
establish	establishment	acid	acidity
rotate	rotation	ripe	ripeness
graze	grazing	short	shortage
delay	delay	precise	precision

2. Differences between nominal and verbal styles

In *everyday language* we use **nouns** to talk about **things** and **verbs** to talk about **actions** or **processes** in a balanced way while in *academic/scientific language* we often use **nouns** to talk about **things**, **actions** and **processes**.

⇓

A different view of the world

⇓

In academic/scientific English almost everything has been turned into a **noun**. When reading academic/scientific texts, we have to reconstruct our mental image of the world so that it becomes a world made out of **things**, rather than a world of happening (i.e. events with things taking part in them).

instead of saying:	a scientist writes:
'we did this, then that happened'	'this action of ours was followed by that event'

(Halliday and Martin 1993: 52.)

Look at two versions of the same sentence. Which is written in a nominal style? Which one do you think it is easier to understand?

'If rainforests are continuously stripped to serve short-term economic gain, the entire biosphere may be damaged.'

'The continuous stripping of the rain forest in the service of short-term gain could result in damage to the entire biosphere.'

(Booth, W.C., G.G. Colomb and J.M. Williams 1995. *The craft of research*. Chicago: The University Chicago Press: 218.)

3. Reasons for using nominalisation

1. **Economy:** packaging a complex process (as shown in Table 2).

- It can be used as subject of the next sentence.
- It can be used later in the text with no further explanations.

- It allows linking the different steps of a scientific text (repetition of what has been said before as the starting point for what is coming next).

e.g. [...] both ethyne and nitrogen oxide are kinetically stable [...]

⇓

[...] the kinetically stability of oxide shows [...]

e.g. 'The **automation** of bacterial **characterization** has begun to yield substantial value in many areas of microbiology investigation.'

(Bruce, J. 1996. Automated system rapidly identifies and characterizes microorganisms in food. *Food Technology*. 50. 1: 81.)

Table 2: Examples taken from an entomology textbook where some common sampling techniques are given a name for further reference.

Process (common sampling techniques in insect pest management)	**Technique →nominalisation** (name given to the technique)
'[...] a cloth, tray, or other receptacle is placed on the ground, a branch is pulled down over the receptacle, and the branch is struck a prescribed number of times with a stick. Insects knocked off fall into the receptacle and are counted.'	knockdown
'[...] a muslin 'net' is swung into the plant canopy, jarring the plants and causing insects on them to fall off and into the net. After a prescribed number of such swings, called sweeps, plant debris is removed, and the insects are counted.'	netting

(adapted from Pedigo, L.P. 1999. *Entomology and pest management*. 3rd edn. Upper Saddle River, N.J.: Prentice Hall: 216; 218.)

2. **Abstraction:** one effect of abstraction is that the writer does not need to refer to the agents of the action.

e.g. 'The continual **development**, **testing** and **improvement of instrumentation**, techniques and experimental **procedures** for the rapid and accurate **enumeration** and **characterization** of microorganisms is a rapid expanding area.'

(Fung, D.Y.C. 1992. New developments in rapid methods for food microbiology. *Trends in Food Science and Technology*. 3: 142.)

3. **Reordering of information**: by having a nominalisation at the beginning of a sentence the writer can stress relevant (new) or long information at the end of the sentence.

In the example below, the first sentence is compressed and **nominalised** at the beginning of the next sentence, and *emphasis* is put on the end of the 2nd sentence.

e.g. 'In short-term studies, Cd [cadmium] applied to agricultural soils as a sulfate, chloride, or nitrate salt was more plant-available and DTPA-extractable [diethylenetriaminepentaacetate] than an equivalent amount of Cd applied in sewage sludge (Heckman et al., 1987; Korcak and Fanning, 1985; Logan and Chaney, 1983). **Differences** in **plant-availability** and **soil extractability** from these two Cd sources may be primarily related to differences in the constituents added with Cd^{2+}.'

(Bell, P.F., B.R. James and R.L. Chaney. 1991. Heavy metal extractability in long-term sludge and metal salt-amended soils. *Journal of Environmental Quality*. 20.2: 481.)

4. **Ease of modification**:

nouns can be made singular or plural;

nouns can be qualified with adjectives.

e.g. 'Organic matter **additions** from sludge **application** may still be significant 10 yr [years] after application.'

(Bell, P.F., B.R. James and R.L. Chaney. 1991. Heavy metal extractability in long-term sludge and metal salt-amended soils. *Journal of Environmental Quality*. 20.2: 481.)

5. **Hide a presupposition:** it makes the reader accept the writer's point of view without arguing.

e.g. '[...] The Kyoto Protocol [protocol on global warming resulting from a meeting in Kyoto, Japan in 1997] requires that the industrialized countries bear a heavier burden with respect to both the abatement and avoidance efforts required to confront the problem of global climate change. U.S. citizens may suffer from this arrangement in two ways. First, they are likely to be required to curtail their use of energy substantially which could lead to a lowering of living standards. Second, stricter environmental standards in the United States may lead to changes in the competitiveness of U.S. firms which may either move to other countries or be driven out of business by firms located in developing countries reducing the well-being of their U.S. employees. **These fears** are reflected in the U.S. Senate resolution as well as recent discussions in the U.S. House of Representatives (UNA-USA) expressing opposition to any global warming agreement that exempts developing countries from participating in the abatement efforts.'

(Wesley, E. and F. Peterson. 1999. The ethics of burden-sharing in the global greenhouse. *Journal of Agricultural and Environmental Ethics*. 11: 192.)

6. **Formality and power:** it makes the text more formal and impersonal and by the use of scientific vocabulary, the writer can make the text accessible only to his/her peers.

4. The role of verbs

In nominal style the information is conveyed by nouns rather than by verbs. Therefore, verbs are less specific than a more normal verbal style. Verbs used in nominal style are usually 'empty verbs' as they only serve to relate abstract nouns or nominalised processes.

Examples:

Nominal style ('empty verbs')	**Verbal style** (more specific verbs)
'Our development and standardization of an index for measurement of thought disorders **has made** possible quantification of responses as a function of treatment differences.'	'Now that we **have developed** and **standardized** an index to **measure** thought disorders, we can **quantify** how patients **respond** to different treatments.'

(adapted from Booth, W.C., G.G. Colomb and J. M. Williams 1995. *The craft of research*. Chicago: The University Chicago Press: 220.)

Thus the use of nominalisation makes it easier to connect ideas, by showing the relation between events and processes.

Event X causes event Y.

or

Process X causes process Y.

Look at the figure below. Which of the words used are nominalisations?

Principles of Hydrology

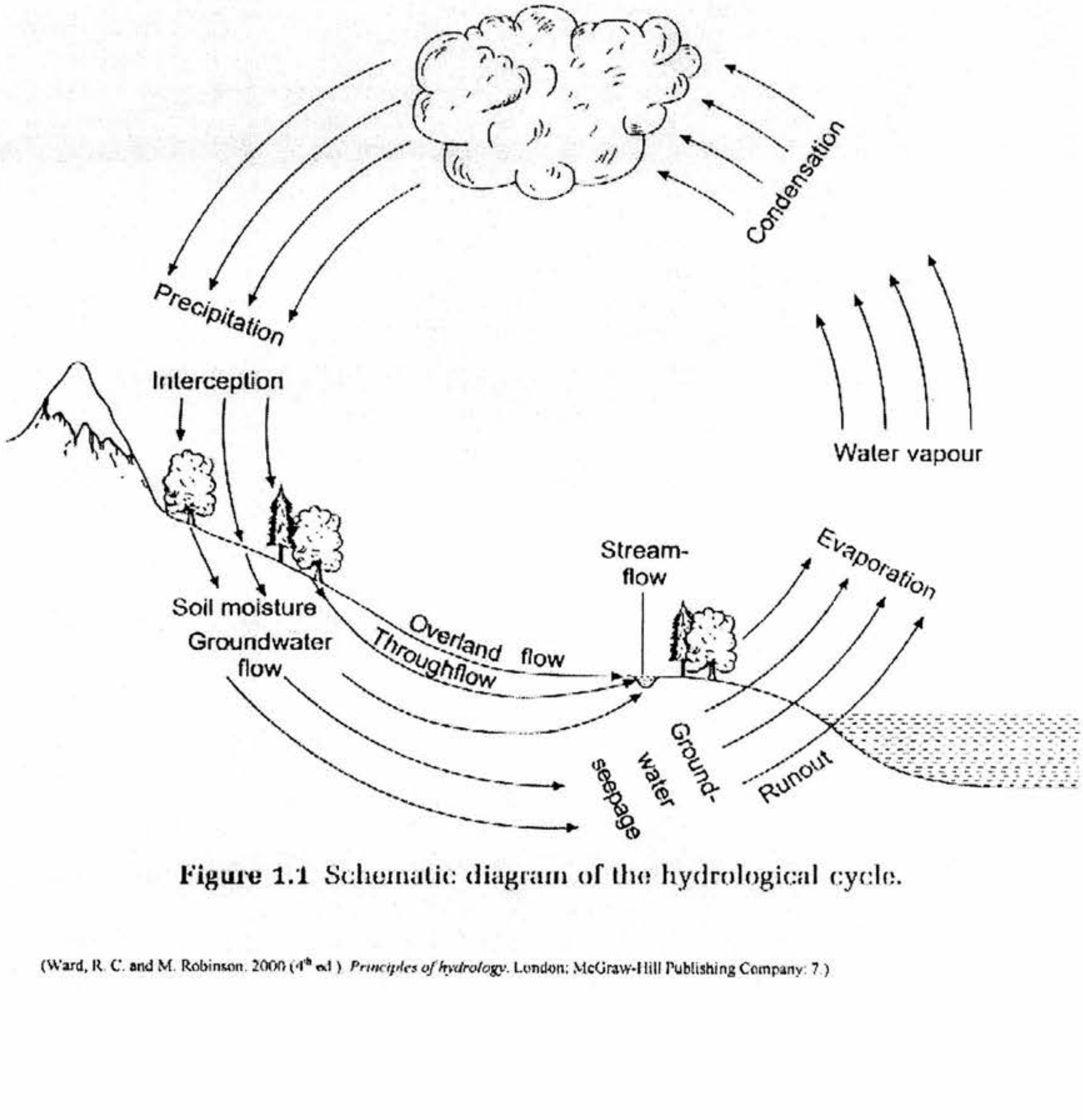

Figure 1.1 Schematic diagram of the hydrological cycle.

(Ward, R. C. and M. Robinson. 2000 (4th ed.). *Principles of hydrology*. London: McGraw-Hill Publishing Company: 7.)

Further reading:

Booth, W.C., G.G. Colomb and J.M. Williams 1995. *The craft of research*. Chicago: The University Chicago Press.

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Unit 6 - Activities B
Nominal style
(40 min.)

TEXTS 6B-1

1. Read the sentences below taken from different textbooks and complete the tasks on the answer sheets provided. (individual work: 5 min.)

1.1 When a cold front catches up to and overtakes a warm front, the frontal boundary created between the two air masses is called an **occluded front**, or simply an ____.

(Arhens, C.D. 1994. Meteorology today: an introduction to weather, climate and the environment. Minneapolis: West Publishing Company: 330.)

1.2 Groups of individuals whose movements are restricted by the physical presence of others are said to be *crowded*. A high density means more likelihood that one animal will come closer to another than its individual distance. As a consequence, the intrusion into individual space may result in an aggressive response or an avoidance reaction which, in turn, results in a further such intrusion. ____ does not necessarily result in increased agonistic behaviour but it often does so.

(Fraser, A.F. and D.M. Broom. 1997. *Farm animal behaviour and welfare*. 3rd edn. Wallingford: CAB International: 130.)

1.3 ____ is the process by which a solid is changed to a liquid. As discussed it requires the absorption of heat energy from the environment, approximately 80 calories of energy per gram of water.

(Lutgens, F.K. and E.J. Tarbuck. 1998. *The atmosphere*. 7th edn. London: Prentice-Hall International, Inc: 76-77.)

1.4 If a flock of sheep is moved from a quiet field to one near a road, they will show an escape response on the first occasion that they see or hear a motor vehicle pass along the road. Subsequent vehicles elicit less response until each member of the flock ceases to show any behavioural response; it habituates. ____ *is the waning of a response, which could still be shown to a repeated stimulus.*

(Fraser, A.F. and D.M. Broom. 1997. *Farm animal behaviour and welfare*. 3rd edn. Wallingford: CAB International: 19.)

TEXTS 6B-2

2. Read the following extracts from academic texts and answer the question on the answer sheets provided. (pair work: 5 min.)

2.1 [...] The housing and management of the broiler flock are distinctly different from that of pullets which serve as replacement for the laying flock.
Chickens used for the production of meat have the inherent **ability to grow** rapidly and attain market weight quickly. This ____ results in higher nutritional requirements than for lighter breeds, and greater feeder, floor space, and ventilation requirement.

(Austic, R.E., M.C. Nesheim. 1990. *Poultry production*. 13th edn. Philadelphia: Lea & Febiger: 132-133.)

2.2 [...] **Cells can be induced to fuse** if two cell populations are brought close together (i.e. high cell concentration) in the presence of viruses or by chemical agents (called 'fusogens'). The process involves a destabilization of adjacent **cell membranes which eventually fuse** to form a hybrid cell. Initially, two distinct nuclei are present in the fused cell (a heteokaryon). Eventually the nuclei fuse to produce a hybrid cell, known as hybridoma (*Figure* 6.3).

Although viruses were used originally as agents for cell ____, the more widely used method now is ____ by the chemical agent polythylene glycol (PEG).

(Butler, M. 1996. *Animal cell culture and technology: the basics*. Oxford: IRL Press: 58-59.)

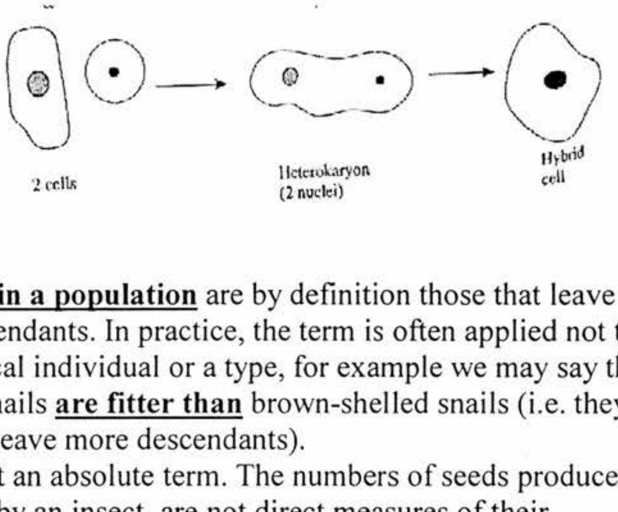

Fig 6.3

2.3 **The fittest individuals in a population** are by definition those that leave the greatest number of descendants. In practice, the term is often applied not to a single individual, but to a typical individual or a type, for example we may say that in sand dunes, yellow-shelled snails **are fitter than** brown-shelled snails (i.e. they are more likely to survive and to leave more descendants).

____ is a relative not an absolute term. The numbers of seeds produced by a plant, or eggs produced by an insect, are not direct measures of their ____; nor indeed are the *numbers* of descendants that they leave. Rather it is the proportionate contribution that an individual makes to future generations that determines its ____: **the fittest individuals in a population** are those that leave the greatest number of descendants *relative to* the number of descendants left by other individuals in the population.

(Begon, M., J.L. Harper and C.R. Townsend. 1996. *Ecology: individuals, populations and communities*. 3rd edn. Oxford: Blackwell Science: 8.)

2.4 Research in Scandinavia has investigated how autumn harvested leeks **<u>can be stored</u>** through the winter (Hoftun, 1978a, b). More recent research on the ____ of leeks harvested in early spring in England has broadly confirmed the Scandinavian findings on the best regimes for preserving high quality leeks.

(Brewster, J.L. 1994. *Onions and other vegetable alliums*. Wallingford: CAB International: 166.)

2.5 Let us explain this second point more fully. Biologists recognize organisms as members of the same species if the individuals are capable of breeding with each other, **<u>freely exchanging genetic material</u>** and producing fertile offspring. Such genetic ____ tends to result in homogeneity in the genetic character of a population (as does the reassortment of genes resulting from genetic recombination).

(Begon, M., J.L. Harper and C.R. Townsend. 1996. *Ecology: individuals, populations and communities*. 3rd edn. Oxford: Blackwell Science: 18.)

TEXTS 6B-3

3. Read the definitions below taken from the book *In vitro culture of higher plants* and complete the task on the answer sheets provided. (plenary: 5 min.)

3.1 A technique for sterilizing instruments by heating a flame after dipping in alcohol.

3.2 The development of cells or tissues with a specific function and/or the regeneration of organs or organ-like structures (roots, shoots, etc.) or (pro)embryos.

3.3 Communication of disease by micro-organisms.

3.4 The phenomenon where the terminal bud of a shoot suppresses the outgrowth of the axillary buds.

3.5 Process by which an embryo develops from a fertilized egg cell or asexually from a (group of) cells.

3.6 Gradual acclimatization of in vitro grown plants to in vivo conditions e.g. gradual decrease in humidity.

(Pierik, R.L.M. 1987. *In vitro culture of higher plants*. Dordrecht and Boston: Martinus Nijhoff Publishers: 9; 11-13.)

TEXTS 6B-4

4. Read the following sentences and complete the task on the answer sheets provided. (pair work: 15 min.)

4.1 Prior to 1970, the fact that air was polluted was regarded principally as a way of threatening public health.

4.2 It is now a routine to vaccinate children, and these vaccines have been enormously important to improve world health.

4.3 Most roots function in various ways. These include to anchor plants firmly to a substrate, to absorb water and minerals and to produce hormones.

4.4 To immunise cells *in vitro* in an effective way scientists are dependent upon the fact that differentiation factors can combine in an optimal way during the process in which the cell is being activated.

4.5 However, agricultural practices have been intensified, specialised and mechanised, which ultimately became key factors in the process of eliminating trees from cultivated fields.

TEXTS 6B-5

5. Read the text you brought to the lesson (if you did not bring a text please ask for one) and **<u>highlight/underline</u>** the nominalisations used. Discuss briefly with your neighbour the use of nominalisations in your text. (15 min.)

TEXT 6B-5

5. Read the following Introduction taken from a journal article and **highlight/ underline** the nominalisations used. Discuss briefly with your neighbour the use of nominal style in your text. (individual or pair work: 15 min.)

Introduction

Atmospheric CO_2 concentrations are increasing progressively relative to those which prevailed in pre-industrial times, current predictions suggesting that there will be a doubling of the present *c.* 360 $\mu l\ l^{-1}$ by the middle of the next century (Schimel, 1995). As a result, numerous comparative analyses of growth responses and of source-sink carbon allocation have been reported using plants grown under ambient and elevated CO_2. These show that though there are large interspecific differences in response, growth enhancement is commonly observed at elevated CO_2 and under these circumstances there is often an increase of C allocation below ground (Zak *et al.*, 1993; Rogers, Runion & Krupa, 1994; Rouhier *et al.*, 1996). However, important questions concerning the localization of C sequestered below ground remains unresolved.

In nature, the roots of most plant species are colonized by mycorrhizal fungal symbionts which, while being sustained by C received from the autotrophs, play a key role in capture of mineral nutrients, notably phosphorus, from soil (Smith & Read, 1997). It is clearly possible, therefore, that under conditions of elevated CO_2, increased allocation of C below ground could have important effects upon the functions of the mycorrhizal symbionts. Unfortunately, only a few studies have provided assessment of the impacts of CO_2 enrichment upon mycorrhizal function. Most of these have examined effects upon the extent of mycorrhiza formation rather than on functional aspects. Pioneering work of Norby *et al.* (1987) and O'Neill, Luxmoore & Norby (1987) on the ectomycorrhizal species *Quercus alba* and *Pinus echinata* showed that the amount of fungal colonization increased at elevated CO_2, but that the effects were time-dependent. Ineichen, Wiemken & Wiemken (1995) subsequently confirmed this observation in *Pinus*, there being no response to enhancement of CO_2 availability after 2 months of exposure but striking increases of fungal growth after 3 months.

Attention has turned recently to response of plants normally colonized by arbuscular mycorrhizal (AM) fungi. Greater amounts of colonization were observed in roots of the C_4 grass *Bouteloua gracilis* at elevated CO_2 (Monz *et al.*, 1994; Morgan *et al.*, 1994) but not in those of the C_3 grass *Pascopyrum smithii* (Monz *et al.*, 1994), in cotton (*Gossypium hirsutum*) (Runion *et al.*, 1994) or in clover (*Trifolium repens*) (Jongen, Fay & Jones, 1996). In the case of the last species, however, although the proportions of root length colonized did not change, the total mycorrhizal root length almost doubled. Klironomos, Rillig & Allen (1996) found that significantly more root length was occupied by arbuscular hyphae and arbuscules at elevated CO_2, but only under conditions of low nutrient supply.

.../...

(cont.)

The sensitivity of the response of the symbiosis to duration of exposure demonstrated in the case of ectomycorrhiza by Ineichen *et al.* (1995), highlights a weakness in studies of arbuscular systems, most of which appear to have been based upon a single harvest. An exception is the analysis of the response of *Liriodendron tulipifera* (O'Neill, O'Neill & Norby, 1991) in which three harvests were taken over 168 d [days].
We hypothesize that at elevated concentrations of atmospheric CO_2, AM fungi, which are obligately dependent upon their autotrophic partners for C, will, by gaining improved access to the growth-limiting resource, be in a position to scavenge more effectively for nutrients. In order to test this hypothesis, the normally mycorrhiza-responsive herbaceous plant *Plantago lanceolata* (Grime *et al.*, 1987; Francis & Read, 1994) was grown through the major part of its growing cycle, in the presence or absence of mycorrhizal fungal symbionts, in ambient and elevated CO_2. The effect of elevated CO_2 upon plant growth, P acquisition and mycorrhizal colonization was followed by sequentially harvesting the plants over 104 d.

(Rouhier, H. and D.J. Read. 1998. The role of mycorrhiza in determining the response of *Plantago lanceolata* to CO_2 enrichment. *New Phytologist*. 139: 367-368.)

Unit 6 - Activities B
Answer sheets
(45 min.)

TEXTS 6B-1

1. Fill in the gap with one of the nouns (i.e. nominalisation) given in the box. The first one is done for you. (individual work: 5 min.)

crowding	habituation	melting	occlusion

Sentence	Nominalisation
1.1	occlusion
1.2	
1.3	
1.4	

TEXTS 6B-2

2. Fill in the gaps in the text with the appropriate nominalisation paying attention to the **highlighted** words. Use the table below for your answers. The first one is done for you. (pair work: 5 min.)

Sentence	Nominalisation
2.1	growth
2.2	
2.3	
2.4	
2.5	

TEXTS 6B-3

3. Match the definitions with the corresponding nominalisation given in the table below. The first one is done for you. (plenary: 5 min.)

Nominalisation	Definition (number)
Apical dominance	3.4
Differentiation	
Embryogenesis	
Flaming	
Hardening off	
Infection	

TEXTS 6B-4

4. Rewrite the sentences you have just read in a more nominal style. More than one answer is possible. The first one is done for you. (pair work: 15 min.)

4.1	Prior to 1970, air pollution was regarded as a threat to public health.
4.2	
4.3	
4.4	
4.5	

Unit 6 – Activities C

(20 min.)

TEXTS 6C-1

1. Read the two versions of the abstract (**A** and **B**) below and complete the tasks on the answer sheets provided. One of the versions is the original text and the other has been adapted.

VERSION A

Abstract

When winter wheat (*Triticum aestivum* L.) is maturing the presence of late frost may decrease seed quality. Thus, farmers who grow wheat in Kansas were particularly concerned about whether the seeds which had been damaged by frost during 1992 were suitable for planting. This study was conducted to evaluate the quality and performance of seeds in lots of seeds which frost had damaged. We sized eleven lots of cv. TAM 107 with a range of test weights. We measured the quality of seeds taking into account seed size and weight. We measured seed performance by comparing how seeds germinated and how seeds aged both in an accelerated and in a natural way. Finally, we measured seedling performance by observing how seeds which had been planted at different depths emerged. On the one hand, damage caused by frost decreased test weight and the percentage of large seeds. On the other hand, damaged caused by frost increased the percentage of small seeds. Large seeds germinated better after harvest and aged more easily, regardless of the degree of damage caused by frost to the seed lots, whereas small seeds germinated less when they were more injured by frost. The number of seedlings which emerged from large seeds was higher than the number of seedlings which emerged from small damaged seeds. Farmers could increase the quality of the seeds, which frost had damaged while they were maturing, by cleaning and removing small seeds, or they could sow more seeds to compensate for the fact that seeds were small. In addition, when stored, seeds which frost damaged will not deteriorate.

Additional index words: seed weight, seed ageing, seed storage, seedling emergence, test weight.

VERSION B

Abstract

Late frost during maturation of winter wheat (*Triticum aestivum* L.) may decrease seed quality. Wheat growers in Kansas were particularly concerned whether seed damaged by frost during 1992 was suitable for planting. This study was conducted to evaluate the seed quality and performance of frost damaged seed lots. Eleven seed lots of cv. TAM 107 with a range of test weights were seized, quality was measured by seed size and weight, seed performance was measured by germination and accelerated and natural ageing, and seedling performance was measured by emergence from different planting depths. Frost damage decreased test weight and the percentage of large seeds and increased the percentage of small seeds. Germination after harvest and ageing was high for large seeds, regardless of degree of frost damage to the seed lots, whereas germination of small seeds decreased as frost injury increased. Emergence of seedlings was also high from large seeds and low from small, damaged seeds. Quality of seed damaged by frost during maturation could be increased by cleaning to remove small seeds, or higher sowing rates could be used to compensate for small seeds. Frost damage seed can be stored without further deterioration.

Additional index words: seed weight, seed ageing, seed storage, seedling emergence, test weight.

(Foster, N.R., L.A. Burchett and G.M. Paulsen. 1998. Seed quality of hard red wheat damaged by frost during maturation. *Journal of Applied Seed Production*. 16: 83.)

2. Read the three subheadings taken from the textbook *Practical skills in environmental science* paying attention to the nouns **highlighted**. Then complete the tasks on the answer sheets provided.

Field site **inspection**

Risk **assessment**

Microbiological **sampling**

(Jones, A., R. Duck, R. Reed and J. Weyers. 2000. *Practical skills in environmental science*. Harlow: Prentice Hall: 5; 21; 91.)

TEXTS 6C-3

3. Read the three passages below and answer the question on the answer sheets provided.

A

Title: Making a single __1__

In analytical work, you may need to dilute a stock solution to give particular mass concentration, or molar concentration. Use the following procedure:

Transfer an accurate volume of stock solution to a volumetric flask, using appropriate equipment (Table 3.1).
Make up to the calibration mark with solvent – add the last few drops from a pipette or solvent bottle, until the meniscus is level with the calibration mark.
Mix thoroughly, either by repeated inversion (holding the stopper firmly) or by prolonged stirring, using a magnetic stirrer. Make sure you add the magnetic flea *after* the volume adjustment step.

(Jones, A., R. Duck, R. Reed and J. Weyers. 2000. *Practical skills in environmental science*. Harlow: Prentice Hall: 14-15.)

B

Title: __2__

The first stage of any drawing is to decide exactly what to draw – this may seem obvious, but until you have focused your thoughts, you will not be able to decide on the answers to the following questions:

What is the purpose of the drawing?
What type of drawing is required?
What should go into it?
What magnification or reduction is required?

Once these decisions are made, you can determine the position and size of your diagram. Your diagram should be as large as possible, but remember to leave space for legends and labels.

(Jones, A., R. Duck, R. Reed and J. Weyers. 2000. *Practical skills in environmental science*. Harlow: Prentice Hall: 52-53.)

C

Title: Cultivar __3__

In choosing a cultivar, either legume or grass, it is important to match its characteristics with the moisture requirements and tolerance to the conditions in which it will be grown. If the soil is very wet and acid, the grass or legume adapted to each situation would be quite different than for a site showing well-drained soil. For example planting alfalfa in an area with poor soil drainage would not be an acceptable alternative, whereas birdfoot trefoil would be the legume choice.

(Horrock, R.D. and J.F. Vallentine. 1999. *Harvested forages*. San Diego: Academic Press: 132; 134.)

Unit 6- Activities C
Answer sheet
(20 min.)

TEXTS 6C-1

1. Tick (✓) the appropriate box.

Questions	A	B
1.1 Which version do you consider easier to understand?		
1.2 Which version do you think is written in a more academic style?		
1.3 Which one do you think is the original version?		

2. Answer the questions below.

2.1 Which verb does the **highlighted** noun come from? Complete the table below. The first one is done for you.

Subheadings	Verbs
Field site **inspection**	inspect
Risk **assessment**	
Microbiological **sampling**	

2.2 Explain briefly in your own words (i.e. paraphrase) the process to which each subheading refers. You can answer either in English or in Portuguese. Answer overleaf.

TEXTS 6C-3

3. Choose the most appropriate title or word to complete the title from the box below. Write your answer in the table below. The first one is done for you.

adaptation	dilution	planning

Text	Word
A	dilution
B	
C	

Unit 7 - Plan
Hedging

I. Aims

Unit 7 will analyse the use of hedging devices as a way of modulating the propositional content that is being conveyed and of expressing a writer-reader relationship.

Comprehension may be hindered or even distorted by:

- lack of awareness of the use of caution;
- expressions of tentativeness;
- need to mediate claims in academic texts.

It is also important to raise awareness of the fact that hedging can be used as a negative politeness strategy.

II. Methodology and materials

1. **Warm-up: Activities A**

- Reading several sentences taken from different abstracts and deciding whether hedges are used or not. (S: individual)
- Reading two versions of a discussion section and deciding in which version the writers are more committed to their utterances and in which the writers modulate their claims or statements. (S: individual)

2. Lesson

- Checking the answers to Activities A (key is given). (S/T)
- The unit handout will be distributed and briefly commented on: explaining and discussing the use of hedges in academic texts. (S/T)

Activities B:

Task 1: Reading a discussion section and hedging some phrases highlighted in the text. (S/T)

Task 2: Reading the notes on the results and discussion of a short communication and writing two short versions of the abstract sentence(s) referring to the results and discussion: one hedged and one not hedged. (S: pairs)

Task 3: A text either brought by each participant or given by the teacher[1] will be read underlying the hedges. Participants briefly discuss in pairs the use of hedges in their texts. (S: individual or pairs)

3. **Follow-up: Activities C**

- Reading several sentences taken from different abstracts and deciding whether hedges are used or not. (S: individual)
- Reading two versions of a discussion section and deciding in which version the writer is more committed to his utterances and in which the writer modulates his claims or statements. (S: individual)

4. Answering a short questionnaire (S: individual)

5. Homework

III. Schedule

1. Warm-up: Activities A (20 min.)

2. Lesson
- Explanation and discussion (15 min.)
- **Activities B**:
  Task 1. (10 min.)
  Task 2. (15 min.)
  Task 3. (15 min.)

3. Follow-up: Activities C (20 min.)

4. Short questionnaire (5 min.)

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[1] Woolhouse, M.E.J., S.M. Stringer, L. Matthews, N. Hunter and R.M. Anderson. 1998. Epidemiology and control of scrapie within sheep flock. *Proceedings of the Royal Society of London: Series B*, Biological Sciences. 265: 1205-1206.

Unit 7 - Activities A

(20 min.)

TEXTS 7A-1

1. **Read the following sentences taken from abstracts and complete the tasks on the answer sheets provided.**

1. These results indicate that seed N [nitrogen] content and concentration may be important in seedling performance (seedling weight and field emergence) and that use of standard germination may be failing to detect field treatment effects on seed quality.

(Bennett, J.S., J.S. Rowarth and Q.F. Jin. 1998. Seed nitrogen and potassium influence browntop (*Agrostis capillaris* L.) and perennial ryegrass (*Lolium perenne* L.) seed performance. *Journal of Applied Seed Production*. 16: 77.)

2. The automated spray system reduces pesticide exposure to the applicator and others and thus reduces potential liability for the employer, facilitates better control on application rates, is more repeatable than hand application, reduces costs of hazardous waste disposal, and reduces disruption of other greenhouse operations.

(Rowe, D.E., S. Malone and Q.L. Yates. 2000. Automated greenhouse spray system for increased safety and flexibility. *Crop Science*. 40: 1176.)

3. Mowed plots had higher herbage production and tended towards a greater white clover content than grazed plots. Compaction of the surface to a depth of 10 cm in the grazed plots may have been a factor in the observed difference in herbage production.

(Muto, P.J. and R.C. Martin. 2000. Effects of pre-treatment, renovation procedure and cultivar on the growth of white clover sown into a permanent pasture under both grazing and mowing regimes. *Grass and Forage Science*. 55: 59.)

4. Economic analyses of data suggest that growers can significantly increase profit/hectare by optimizing spacing and populations with Atlantic [a potato variety] and seedpiece populations in Superior [another potato variety].

(Creamer, N.G., C.R. Crozier and M.A. Cubeta. 1999. Influence of seedpiece spacing and population on yield, internal quality, and economic performance of Atlantic, Superior, and Snowden potato varieties in Eastern North Carolina. *American Journal of Potato Research*. 76: 257.)

5. It is postulated that the difference between Greek and British pines in Ca [calcium] nutrition reflects the differing dominant soil characteristics between the two countries.

(Kavvadis, V.A. and H.G. Miller. 1999. Manganese and calcium nutrition of *Pinus sylvestris* and *Pinus nigra* from two different origins. II. Calcium. *Forestry*. 72:2: 147.)

6. Condition score changes and energy balance measures on a small subgroup of the animals, while indoors offered a diet of silage and concentrates (n = 33), demonstrated that high genetic merit had a more negative energy balance than did medium genetic merit. The results clearly illustrate the production potential of high genetic merit cows on grass-based systems.

(Buckley, F., P. Dillon, M. Rath and R.F. Veerkamp. 2000. The relationship between genetic merit for yield and live weight, condition score, and energy balance of spring calving Holstein Friesian dairy cows on grass based systems of milk production. *Journal of Dairy Science*. 83: 1878.)

7. As might have been anticipated, variation is so large that this group have demonstrated that four sampling days is inadequate for obtaining background information and does not address seasonal changes. Multiple sampling points are informative although 10 would probably be too many for routine monitoring.

(Public Health Laboratory Service Water Surveillance Group. 1995. Preliminary study of microbiological parameters in eight inland recreational waters. *Letters in Applied Microbiology*. 21: 270.)

8. Control measures currently or likely to become available may reduce the incidence of [scrapie] cases but may be fully effective only over a period of several years.

(Woolhouse, M.E.J., S.M. Stringer, L. Matthews, N. Hunter and R.M. Anderson. 1998. Epidemiology and control of scrapie within a sheep flock. *Proceedings of the Royal Society of London: Series B, Biological Sciences*. 265: 1205.)

TEXTS 7A-2

2. Read the two versions of a discussion section and complete the task on the answer sheets provided. One of the versions is the original text and the other has been adapted.

VERSION A

Discussion

The results reported here demonstrate very clearly that the journeys experienced by lambs travelling from farm to slaughter varied considerably from the very simple to the highly complex: 26 different journey structures were identified during the course of this investigation. Furthermore, the analysis of journey structures showed that the complexity of the journey was related to the distance travelled during the journeys.

The comparison between marketing distribution channels (in which electronic auction markets were examined for the first time) showed that lambs sold directly from farm to abattoir experienced shorter journeys (in terms of both median duration and distance) than lambs sold through either of the other two channels. Lambs sold through electronic auctions, on average, travel longer distances but for shorter times than lambs sold through livestock auction markets. Although these results are broadly consistent with the common perception that direct sale lambs experience simpler journeys than lambs passing through the other channels, they do not support this view unequivocally.

The journey distances and durations illustrated in Figures 2 and 3 demonstrate that, although the median journey durations and distances travelled by lambs sold directly are shorter than lambs sold through the other two channels, some lambs sold through direct sales actually experience very long journeys (more than 10 h and over 400 km). Indeed, the longest recorded journeys (700.1 km) were in the direct sale marketing channel. This analysis of journey structure, therefore, shows that there is not as clear a distinction between these three marketing channels as has previously been stated (Cockram & Lee 1991; Knowles *et al* 1994b; Jarvis *et al* 1995). Moreover, when viewed alongside the relationship between journey complexity increasing with distance travelled, some lambs may have experienced extremely complex journeys, irrespective of the marketing channel through which they had travelled to slaughter.

VERSION B

Discussion

The results reported here suggest that the journeys experienced by lambs travelling from farm to slaughter varied considerably from the very simple to the highly complex: 26 different journey structures were identified during the course of this investigation. Furthermore, the analysis of journey structures indicate that the complexity of the journey appears to be related to the distance travelled during the journeys.

The comparison between marketing distribution channels (in which electronic auction markets were examined for the first time) suggested that lambs sold directly from farm to abattoir experienced shorter journeys (in terms of both median duration and distance) than lambs sold through either of the other two channels. Lambs sold through electronic auctions, on average, travel longer distances but for shorter times than lambs sold through livestock auction markets. Although these results tend to be consistent with the common perception that direct sale lambs experience simpler journeys than lambs passing through the other channels, we believe that these results are unlikely to support this view.

The journey distances and durations illustrated in Figures 2 and 3 seem to demonstrate that, although the median journey durations and distances travelled by lambs sold directly are shorter than lambs sold through the other two channels, some lambs sold through direct sales actually experience very long journeys (more than 10 h and over 400 km). Indeed, the longest recorded journeys (700.1 km) were in the direct sale marketing channel. This analysis of journey structure, therefore, indicates that apparently there is not as clear a distinction between these three marketing channels as has previously been stated (Cockram & Lee 1991; Knowles *et al* 1994b; Jarvis *et al* 1995). Moreover, when viewed alongside the relationship between journey complexity increasing with distance travelled, some lambs may have experienced extremely complex journeys, irrespective of the marketing channel through which they had travelled to slaughter.

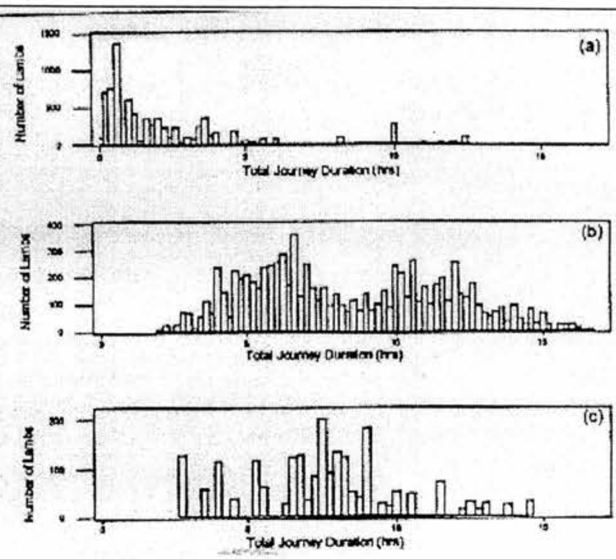

Figure 2 Frequency distribution of journey durations (h) experienced by lambs from farm to slaughter: (a) direct sales; (b) livestock auction markets; (c) electronic auctions.

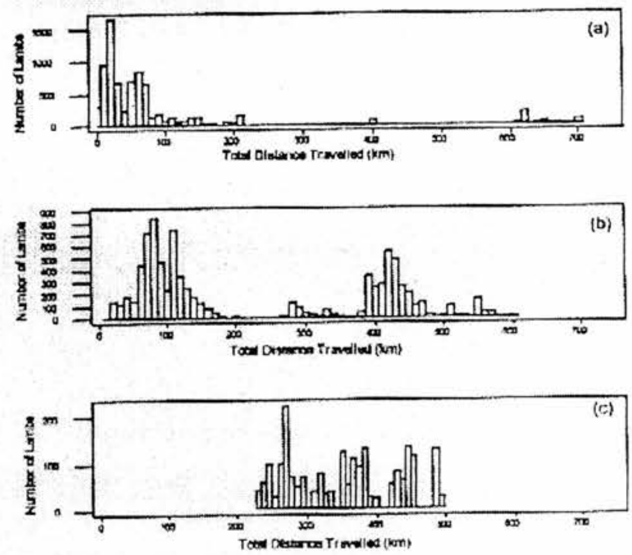

Figure 3 Frequency distribution of distances travelled by lambs from farm to slaughter: (a) direct sales; (b) livestock auction markets; (c) electronic auctions.

(Murray, K. C., D. H. Davies, S. L. Cullinane, J. C. Eddison and J. A. Kirk. 2000. Taking lambs to the slaughter: marketing channels, journey structures and possible consequences for welfare. *Animal Welfare* 9: 118-120.)

Unit 7 - Activities A
Answer sheets
(20 min.)

TEXTS 7A-1

1.1 Try to find the writers' commitment and certainty to what they are saying. Complete the table below by deciding how committed the writers are. Write the sentence numbers in one of the two columns provided according to your choice. The first one is done for you.

	The writers are **committed** to what they are saying	The writers are **tentative** or **do not want to make absolute statements** about what they are saying
Sentence numbers		**1**

1.2 Write down the parts of the text that helped you in the choice for the previous question. The first one is done for you.

Sentence number	**Words that helped you in your choice**
1	**indicate; may be important; may be failing**
2	
3	
4	
5	
6	
7	
8	

TEXTS 7A-2

2. Decide in which version the writers are more committed to their utterances and in which the writers modulate their claims or statements.

WRITERS' ATTITUDE	VERSION
The writers are more **committed** to what they are saying	
The writers are more **tentative** or **do not want to make absolute statements** about what they are saying	

Unit 7
Hedging

Aims

Unit 7 will focus on the use of words and expressions which modulate the writer's commitment to what he/she is saying (i.e. hedging).

To be aware of hedging may help you to understand whether the writer is being:

- cautious;
- tentative;
- modulating a claim or statement in an academic text;
- polite;
- expressing a writer-reader relationship

A characteristic of academic writing is that writers modulate their claims or statements – they comment on what they are writing about. In other words, writers may indicate various degrees of certainty or commitment to what they are discussing. This is often referred to as 'hedging' (see definition below).

1. Definition

Hedging is when a writer uses a word or expression which helps us to see how committed he/she is to what he/she is writing about (see Tables 1, 2 and 3).

Table 1: A selection of words and expressions used as hedging devices which show the writer's opinion about what he/she is discussing. The most common ones are modal and lexical verbs.

Words or expressions used in hedging		
Verbs	**Modal verbs** (uncertainty + degrees of tentativeness)	could, may, might, should, would (sure) will ⇒ would ⇒ should ⇒ may ⇒ could (tentative)
	Lexical verbs (doubt + evaluation)	appear, assume, believe, indicate, seem, suggest, tend, speculate
Adverbs (probability)		apparently, hardly, likely, occasionally, often, perhaps, possibly, practically, probably, quite, scarcely, slightly, unlikely
Adjectives		certain, definite, possible, probable, uncertain, undoubted
Nouns		assumption, claim, estimate, possibility
Approximators (of quantity, degree, frequency and time)		approximately, little, often, roughly, usually
Expressions (express the writer's personal doubt and direct involvement)		I believe… To our knowledge… It is our view that…
Emotionally-charged intensifiers (i.e. words that modify the meaning of other words by making their meaning stronger)		extremely difficult/interesting of particular importance particularly encouraging unexpectedly surprisingly
Compound hedges (i.e. hedges in combination)		It may suggest that… It would seem likely that… It seems reasonable to assume…

(adapted from Salager-Meyer 1994: 149-170 and Hyland 1994: 239-256.)

Table 2: **Modal auxiliaries: degrees of tentativeness**

	(SURE)	**Examples**
no doubt about the future	$\boxed{\text{WILL}}$ ⇓	The data contained in this report **will** supplement that presented in our earlier publication.
no doubt about the future, assuming certain conditions	$\boxed{\text{WOULD}}$ ⇓	The purpose of this study was to determine if the use of home computers **would** improve the math scores of third grade children.
reasonable expectation about the future	$\boxed{\text{SHOULD}}$ ⇓	This alternative method should simplify the analysis procedure.
some doubt about the future	$\boxed{\text{MAY}}$ ⇓	Both of the factors studied here **may** be of importance in explaining the occurrence of this disease.
more doubt about the future	$\boxed{\text{COULD}}$	Results of this study **could** have considerable impact on estimates of land values.

(Weissberg and Buker 1990: 83.)

Table 3: **Words and phrases: degrees of tentativeness**

Words and phrases (probability)	+ certain almost certain ↓ very probable/highly likely possible unlikely – very unlikely/ highly improbable	+ definite possibility strong possibility ↓ good possibility possibility slight possibility – remote possibility

2. Use

In **journal articles** hedging tends to be used more in the **Introduction** and **Discussion** sections than the Methods and Results sections.

In **textbooks** (and in popular articles) the use of hedging is often replaced by accredited facts (i.e. facts that are widely accepted by the scientific community) and/or definite statements such as '**they found**' instead of '**this indicates the possibility**'.

Which sentence belongs to a textbook and which to a research article?

'Transferring the information contained in DNA to form a functional enzyme occurs through protein synthesis, a process accomplished in two stages - transcription and translation. (MBT5)'	'It therefore *seems likely* that these genes *may* contribute to a general chromosome-partitioning mechanism of wide importance. (MB2)'

(quoted by Hyland, K. 1999. Talking to students: metadiscourse in introductory course books. *English for Specific Purposes.* 18.1: 17.)

3. Reasons for hedging

3.1 In textbooks hedging can be used

1. to speculate about the future

e.g. 'The wider range of products and processes **should lead** to increased research and development concentrated on better understanding of fixation mechanisms, biodeterioration and application of more novel chemical and physical methods of protection.'

(Connell, M. 1991. Industrial wood preservatives – the history, development, uses, advantages, and future trends. In Thompson, R. (ed.) *The chemistry of wood preservation.* Cambridge: The Royal Society of Chemistry: 32.)

2. to speculate about the distant past

e.g. 'Phylogenetic relationships exist that show that diverse species and the lineages they represent did not arise spontaneously, but **may have had** a common ancestral form.'

(Jones, S.B. and A.E. Luchsinger. 1987. *Plant systematics.* 2nd edn. New York: McGraw-Hill: 3.)

3. to generalise

e.g. 'Contractile roots **may be** more common than is generally appreciated. Many seeds germinate at or near the soil surface; root contraction **may be** the means by which the shoot becomes anchored in the soil.'

(Mauseth, J.D. 1995. *Botany: an introduction to plant biology*. 2nd edn. Philadelphia: Sanders College Publishing: 189.)

4. to make a distinction between false past assumptions and the present certainties

e.g. '**It was argued** that the simple sporangiospores of the zygomycetes **could be developed** after only a short period, while the more elaborate fruit bodies of the ascomycetes **would require** a longer built-up, and the even larger basidiomata of the Coprini **would need** the longest preparation of all. [...]'

'We **now know that** the various components of the substrate are far from exhausted after the initial flushes of growth and sporulation. **What has really happened** is that *Coprinus* has seized control by suppressing most of the other fungi. Hyphae of *Coprinus* are **actually** ... [...] (MBT2)'.

(from a microbiology textbook: quoted in Hyland 1999. Talking to students: metadiscourse in introductory course books. *English for Specific Purposes*. 18.1: 18.)

3.2 In journal articles hedging can be used:

1. to qualify commitment;

2. to indicate personal modesty and honesty;

3. to signal distance;

4. to protect the reputation of the writer as a researcher;

5. to give the writer the possibility of other interpretations (i.e. it is a provisional statement that 'leaves the door open' to alternatives);

6. to be polite (e.g. to show solidarity with readers; avoid making direct criticisms; to show respect for the scientific community);

7. to express scientific uncertainty and doubt;

8. to comment on or criticise other works referred to or to show the limitations of the writer's own work;

9. to generalise the writer's results and suggest further developments or applications to the writer's work.

(based on Salager-Meyer 1994: 150-151.)

Further reading:

Swales, J.M. and C.B. Feak. 1994a. *Academic writing for graduate students*. Ann Arbor, Michigan: The University of Michigan Press.

Swales, J.M. and C.B. Feak. 1994b. *Academic writing for graduate students: commentary*. Ann Arbor, Michigan: The University of Michigan Press.

Weissberg, R.C. and S. Buker. 1990. *Writing up research: experimental research report writing for students of English*. Englewood Cliffs, NJ: Prentice Hall Regents.

Other references:

Crismore, A. and R. Farnsworth. 1990. Metadiscourse in popular and professional science discourse. In Nash, W. (ed.) *The writing scholar: studies in academic discourse*. Newbury Park, C.A.: Sage: 118-136.

Hyland, K. 1994. Hedging in academic writing and EAP textbooks. *English for Specific Purposes*. 13.3: 239-256.

Hyland, K. 1999. Talking to students: metadiscourse in introductory course books. English for Specific Purposes. 18.1: 3-26.

Jordan, R.R. 1997. *English for academic purposes: a guide and resource book for teachers*. Cambridge: Cambridge University Press: 240-243.

Myers, G. 1989. The pragmatics of politeness in scientific articles. *Applied Linguistics*. 10.1: 1-35.

Salager-Meyer, F. 1994. Hedges and textual communicative function in medical English written discourse. *English for Specific Purposes*. 13.2: 149-170.

Skelton, J. 1988. The care and maintenance of hedges. *ELT Journal*. 42.1: 37-43.

Unit 7 – Activities B
Hedging
(40 min.)

TEXT 7B-1

1. Read this adapted version of the Discussion section of a paper presented at *Trees for shelter* seminar organised by three Scottish-based institutions: the Forestry Commission Research Division, the Macaulay Land Use Research Institute, and the Scottish College of Agriculture. Then complete the task on the answer sheets provided. (plenary: 10 min.)

Discussion

Can the axiom that 'trees are good for wildlife' be maintained? Most, if not all, studies **1. demonstrate** that the introduction of woody vegetation into landscape without trees is going to increase the species richness of that landscape. However, there are some landscapes which, by their very open nature, **2. do not benefit** from this increased species richness. This **3. is not true** of peatlands, coastal areas, etc., where trees **4. are not** a natural feature, and the species of these environments may decline if forests or woodlands are planted.

However, trees for shelter are most likely to be considered in urban environments or agricultural landscapes which, before the advent of agriculture, **5. have carried** woodland. If the visual appearance of those landscapes is to be enhanced then low density planting (or regeneration) is required with a well-dispersed tree cover. If the woodland wildlife value of those landscapes is to be enhanced, then what is required is small (>0.5 ha) to medium (>5.0 ha) blocks of woodland, with appropriate interconnections. At first glance these two requirements **6. are not compatible**.

The available evidence **7. shows** that the axiom is true. The presence of trees in an agricultural landscape does have the capacity to enhance species richness. If woodland species are required, a real woodland environment has to be created, which means blocks of more than 5 ha in extent are required. These **8. do not contribute greatly** to the visual appearance of that landscape, which is improved by a more diffuse pattern of trees. However, these diffuse trees, or small groups of trees, **9. act** as 'stepping stones' for wildlife species, especially when they are integrated with linear features, such as hedgerows and streamside plantings. Does this mean that, to achieve both wildlife and landscape objectives, blocks of woodland and diffuse planting of trees is required?

.../...

(cont.)

The evidence is still patchy and is derived from the examination of existing woods. Ecological research really requires a more experimental approach, monitoring the development of patches of woodland and the speed with which they recruit both generalist and woodland species. The kind of techniques used by Simberloff and Wilson (1969), monitoring the colonisation of empty 'islands', and those of Margules (1992) in creating 'islands' from pre-existing forests, are potential research tools. Landscape research will need to explore the perceptions of people living in or using the countryside, exploring the ways that trees contribute to the visual attractiveness of an area in which outdoor recreation is appealing. Economic research can focus on the balance sheet of ecological and social benefits of a diverse environment, while looking at the costs associated with its creation and the possible loss of agricultural production. All these ideas lead to interdisciplinary research. On the ground we have created mosaics: the 20th century landscape. Is this what future generations will thank us for?

(adapted from Usher, M. 1997. Shelter and wildlife. In Palmer, H., B. Gardiner, M. Hislop, A. Sibbald and A. Duncan (eds.) *Trees for shelter*. Edinburgh: Forestry Commission: 37-38.)

2. Read the following notes on the results and discussion of a short communication. Then complete the tasks on the answer sheets provided. (pair work: 15 min.)

Experiment: compare the digestibility of five concentrate ingredients in cattle and sheep

Ingredients: barley, beet pulp, citrus pulp, maize gluten feed and grain screenings

Results:

Maize gluten feed: cattle digested better
Other four feeds (concentrates): difference not significantly statistically

Discussion:

No support of previous conclusions (i.e. sheep digest concentrates better than cattle)
There are differences within specific feeds

(adapted from O'Mara, F.P., J.E. Coyle, M.J. Drennan, P. Young and P.J. Caffrey. 1999. A comparison of some concentrate feed ingredients in cattle and sheep. *Animal Feed Science and Technology*. 81: 167-174.)

3. Read the text you brought to the lesson (if you did not bring a text please ask for one) and **highlight/underline** the hedges used. Discuss briefly with your neighbour the use of hedges in your text. (individual or pair work: 15 min.)

TEXT 7B-3

3. Read the following Introduction taken from a journal article and **highlight/ underline** the hedges used. Discuss briefly with your neighbour the use of hedging in your text. (individual or pair work: 15 min.)

1. INTRODUCTION

Scrapie is a transmissible spongiform encephalopathy that occurs naturally in sheep and causes progressive deterioration of neurological function, loss of condition, and death. The disease has been known for more than 200 years and has been reported from many different countries worldwide. Scrapie is associated with an abnormal form of the prion protein (PrP) (Caughey & Chesebro 1997). There is no cure and methods for diagnosing preclinical cases are still under development (Schreuder *et al.* 1996).

There are limited data on the numbers of cases of scrapie within the UK. The disease became notifiable in 1993 and, typically, approximately 400 cases are reported annually, corresponding to an incidence of less than one per 1000 000 sheep per year. However, reported cases are believed to greatly underestimate the true incidence; for example, a questionnaire survey has indicated that scrapie cases may have occurred on over 25% of sheep farms (Morgan *et al.* 1990).

The epidemiology of scrapie has recently been reviewed by Hoinville (1996). An important feature is the long mean incubation period of the disease (possibly two years or more). Evidence from experimental infections in mice indicates that the incubation period is a function of the route of infection and the infective dose, and that levels of abnormal PrP in the tissues (especially the central nervous system) increase from the time of first infection to the appearance of clinical signs (Bruce *et al.* 1991). The mechanisms of natural transmission are incompletely understood. There is evidence for vertical transmission from ewe to lamb (Hoinville 1996), which may occur before or shortly after birth. The rapid spread and long-term persistence of scrapie in some flocks is indicative of some form of horizontal transmission, possibly involving the shedding of the infectious agent into the environment via faeces or placental tissue and its subsequent ingestion; it is not known how long infectivity may persist in the environment. Naturally infected sheep are likely to be exposed to a range of infective doses.

There is good evidence for genetic variation in susceptibility to scrapie determined largely by alleles at the PrP locus (Hunter *et al.* 1996). For example, Cheviot sheep of the VV_{136} RR_{154} QQ_{171} genotype are susceptible to natural scrapie, AA_{136} sheep (regardless of genotype at codons 154 and 171) are resistant, and VA_{136} sheep show intermediate susceptibility with VA_{136} RR_{154} QQ_{171} being susceptible and VA_{136} HR_{154} QQ_{171} or VA_{136} RR_{154} RQ_{171} sheep being resistant (Hunter *et al.* 1996). It is not known whether 'resistant' sheep cannot become infected or, by analogy with experimental

.../...

(cont.)

infections of mice (Bruce *et al.* 1991), whether the incubation period in these sheep is so long in relation to sheep life expectancy that clinical signs are never seen. In the latter case it is possible that 'resistant' genotypes may act as carriers.

There is increasing recognition of the desirability of eliminating scrapie infection from the UK sheep flock and more broadly throughout the European Community (Royal Society 1997). Several control options have been suggested, including (i) slaughter of flocks with a history of scrapie; (ii) slaughter of lambs from ewes that subsequently develop scrapie; (iii) slaughter of sheep with susceptible genotypes; (iv) slaughter of sheep with preclinical infections (given a method of diagnosis); (v) breeding only from resistant genotypes; and (vi) changes in husbandry practices to reduce rates of vertical and/or horizontal transmission (given improved knowledge of transmission routes).

We have recently developed a mathematical model of the dynamics of scrapie infection within a sheep flock (Stringer *et al.* 1998). The model incorporates a long and variable incubation period, both vertical and horizontal infection, and genetic variation in susceptibility. The model is based on a set of partial differential equations representing changes over time with respect both to sheep age and to abnormal PrP load in infected sheep. Model outputs are the age-stratified incidence of scrapie cases (which can be detected by disease surveillance), prevalence of infection (which cannot) and changes in allele frequencies (which can be monitored by genotype).

Here we use this model (i) to explore the expected pattern of a scrapie outbreak, comparing the results with available data; (ii) to consider the consequences of two important biological uncertainties, environmental reservoirs of infection and infectious carrier genotypes, and (iii) to explore the potential impacts of different control measures.

(Woolhouse, M.E.J., S.M. Stringer, L. Matthews, N. Hunter and R.M. Anderson. 1998. Epidemiology and control of scrapie within a sheep flock. *Proceedings of the Royal Society of London: Series B, Biological Sciences.* 265: 1205-1206.)

Unit 7 - Activities B
Answer sheet
(40 min.)

TEXT 7B-1

1. In the discussion section you have just read all the hedges were deleted and replaced by more definite statements. Suggest some possible way of hedging the **highlighted** expressions or words. Write your answers in the table below. The first one is done for you (plenary: 10 min.)

Expressions/words in the text	Your suggestion for hedging
1. demonstrate	**indicate**
2. do not benefit	
3. is not	
4. are not	
5. have carried	
6. are not compatible	
7. shows	
8. do not contribute greatly	
9. act	

2. Write two very short versions of the abstract sentence(s) referring to the results and discussion. One version should be hedged and the other non-hedged. Answer overleaf. (pair work: 15 min.)

3. Read the text you brought to the lesson (if you did not bring a text please ask for one) and **highlight/underline** the hedges used. Discuss briefly with your neighbour the use of hedging in your text. (individual or pair work: 15 min.)

Unit 7 - Activities C

(20 min.)

TEXTS 7C-1

1. **Read the following sentences taken from abstracts and complete the tasks on the answer sheets provided.**

1. The results clearly demonstrated that within a dense clover canopy, light intensities can be as low as 1% and that the changing angle of the sun during the day changes the level of light reaching beneath the clover foliage canopy.

(Pasumarty, S.V. and R.G. Thomas. 1998. Limitations to seed set in white clover (*Trifolium repens* L.). IV. Effect of canopy density and shading in the field. *Journal of Applied Seed Production*. 16: 31.)

2. The implications of these results could be important for the design of alternative systems for laying eggs. Birds may be content to perch on artificial materials which could be more hygienic than wood and easier to maintain in a commercial system.

(Lambe, N.R. and G.B. Scott. 1998. Perching behaviour and preferences for different perch designs among laying hens. *Animal Welfare*. 7: 203.)

3. Model simulations for the Mediterranean region indicate that the recent rise in atmospheric CO_2 may already have had significant impacts on productivity, structure and water relations of sclerophyllous shrub vegetation, which tended to offset the detrimental effects of climate change in the region.

(Osborne, C.P., P.L. Mitchell, J.E. Sheehy and F.I. Woodward. 2000. Modelling the recent historical impacts of atmospheric CO_2 and climate change on the Mediterranean vegetation. *Global Change Biology*. 6: 445.)

4. We conclude that market structure is an important determinant of farm structure and environmental regime, and that adoption of pollution control technologies is not equivalent to environmental performance.

(Welsh, R. and B. Hubbell. 1999. Contract hog production and environmental management in the Southern United States. *Agronomy Journal*. 91.6: 883.)

5. Sustained increases in deep body temperature or changes in circadian temperature rhythms in healthy sheep may be a response to psychological distress and, therefore, indicative of poor welfare.

(Parrott, R.F., D.M. Lloyd and D. Brown. 1999. Transport stress and exercise hyperthermia recorded in sheep by radiotelemetry. *Animal Welfare*. 8: 27.)

6. These results suggest that, within crops, carrot and onion plants compete for light over a distance of about 20 cm in each direction and for below-ground resources over a distance of about 50 cm in each direction. For cabbage, interactions between plants appeared to be dominated by the requirement for sufficient space to deploy the shoots for efficient light interception.

(Peach, L., L.R. Benjamin and A. Mead. 2000. Effects on the growth of carrots (*Daucus carota* L.), cabbage (*Brassica oleracea var. capitata* L.) and onion (*Allium cepa* L.) of restricting the ability of the plants to intercept resources. *Journal of Experimental Botany*. 51.344: 605.)

7. Reductions in yields caused by low population density were due to low seed number. Seed number per square meter was directly proportional to the ration of crop growth rate (CGR) to SGR [seed growth rate]. For short-season production, high populations ensured early canopy coverage and maximized light interception, CGR, and crop biomass, resulting in increased seed number and yield potential.

(Ball, R.A., L.C. Purcell and E.D. Vories. 2000. Short-term soybean yield compensation in response to population and water regime. *Crop Science*. 40: 1070.)

8. Therefore slurry reduces the cow's walking speed and alters limb angles during the supporting phase, producing a different walking pattern from cows on dry or wetted concrete.

(Phillips, C.J.C. and I.D. Morris. 2000. The locomotion of dairy cows on concrete floors that are dry, wet, or covered with a slurry of excreta. *Journal of Dairy Science*. 83: 1767.)

TEXTS 7C-2

2. Read the two versions of a passage taken from a Discussion section and complete the task on the answer sheets provided. One of the versions is the original text and the other has been adapted.

VERSION A

Discussion

[...]
The results reported here are similar to the time-activity budgets of the ostriches recorded during the winter where climatic conditions were averaged over 10 min observation periods (Deeming in press). In winter, consumption of food was a priority for the birds (taking over 50% of the budget) with feeding taking precedence during the morning period (1000-1300 h) and foraging being more important during the afternoon (1300-1600 h). This difference was attributed to the consumption of all the concentrate by midday, which forced the ostriches to forage from pasture if they wished to maintain their calorific intake (Deeming in press). [...] Gender differences reported for the time-activity budgets of ostriches during the summer (McKeegan & Deeming 1997; Ross & Deeming 1998) were absent during the winter (Deeming in press). The higher frequency of standing by males may reflect greater vigilance by these birds but the significance of this, in terms of starting to establish or maintain a territory, remains unclear.

The importance of food consumption probably reflects the higher energy requirements of ostriches during the colder conditions of winter. Furthermore, the reduction (of roughly 50%) in the frequency of pacing in males and females during the winter compared with the spring suggests that pacing and walking behaviours (which consume energy without leading directly to food intake) have a lower priority than behaviours like foraging which involve both locomotion and eating. The behavioural difference observed for adult ostriches which are actively breeding and laying eggs have been attributed to the differing energy demands of reproduction in males and females (McKeegan & Deeming 1997; Ross & Deeming 1998). Low egg production was suggested as an explanation for the lack of gender differences in behaviours observed during the spring months (Deeming 1997). [...]

The foraging activity of the ostriches in this study, and that reported by Deeming (in press), strongly suggest that additional supplies of ration may be needed during the afternoon in the winter. [...] Feeding opportunities could also be influenced by group size and their position in the dominance hierarchy (Deeming in press). Furthermore, location of food troughs under shelter would mean that the ostriches would not have to endure wet weather in order to ingest concentrate ration.

VERSION B

Discussion

[...]

The results reported here are similar to the time-activity budgets of the ostriches recorded during the winter where climatic conditions were averaged over 10 min observation periods (Deeming in press). In winter, consumption of food was a priority for the birds (taking over 50% of the budget) with feeding taking precedence during the morning period (1000-1300 h) and foraging being more important during the afternoon (1300-1600 h). This difference was due to the consumption of all the concentrate by midday, which forced the ostriches to forage from pasture if they wished to maintain their calorific intake (Deeming in press). [...] Gender differences reported for the time-activity budgets of ostriches during the summer (McKeegan & Deeming 1997; Ross & Deeming 1998) were absent during the winter (Deeming in press). The higher frequency of standing by males demonstrates greater vigilance by these birds but the significance of this, in terms of starting to establish or maintain a territory, remains unclear.

The importance of food consumption clearly shows the higher energy requirements of ostriches during the colder conditions of winter. Furthermore, the reduction (of roughly 50%) in the frequency of pacing in males and females during the winter compared with the spring proves that pacing and walking behaviours (which consume energy without leading directly to food intake) have a lower priority than behaviours like foraging which involve both locomotion and eating. The behavioural difference observed for adult ostriches which are actively breeding and laying eggs have been attributed to the differing energy demands of reproduction in males and females (McKeegan & Deeming 1997; Ross & Deeming 1998). Low egg production was pointed out as an explanation for the lack of gender differences in behaviours observed during the spring months (Deeming 1997). [...]

The foraging activity of the ostriches in this study, and that reported by Deeming (in press), provide evidence that additional supplies of ration are needed during the afternoon in the winter. [...] Feeding opportunities are also influenced by group size and their position in the dominance hierarchy (Deeming in press). Furthermore, location of food troughs under shelter means that the ostriches will not have to endure wet weather in order to ingest concentrate ration.

(Deeming, D.C. 1998. Effect of winter climatic conditions on the behaviour of adult ostriches (*Struthio camelus*) on a British farm. *Animal Welfare*. 7: 313-314.)

Unit 7 - Activities C

Answer sheets

(20 min.)

TEXTS 7C-1

1.1 Try to find the writers' commitment and certainty to what they are saying. Complete the table below by deciding how committed the writers are. Write the sentence numbers in one of the two columns provided according to your choice. The first one is done for you.

	The writers are **committed** to what they are saying	The writers are **tentative** or **do not want to make absolute statements** about what they are saying
Sentence numbers	**1**	

1.2 Write down the parts of the text that helped you in the choice for the previous question. The first one is done for you.

Sentence number	**Words that helped you in your choice**
1	**clearly demonstrated**
2	
3	
4	
5	
6	
7	
8	

TEXTS 7C-2

2. Decide in which version the writer is more committed to his utterances and in which the writer modulates his claims or statements.

WRITERS' ATTITUDE	VERSION
The writer is more **committed** to what he is saying	
The writer is more **tentative** or **does not want to make absolute statements** about what he is saying	

Unit 8 - Plan
Reporting verbs

I. Aims

Unit 8 will discuss the use of different reporting verbs, a topic related to hedging, as ways of asserting the degree of the writer's commitment to the propositional content which is being conveyed.

II. Methodology and materials

1. Warm-up: Activities A

- Reading an extract from a review article and underlining the reporting verbs used. (S: individual)
- Filling in a table by classifying the reporting verbs from the previous activity into three categories according to the writers' point of view (i.e. committed, neutral, tentative). (S: individual)

2. Lesson

- Checking the answers to Activities A (key is given). (S/T)
- The unit handout will be distributed and briefly commented on: explaining and discussing the use of reporting verbs in academic texts. (S/T)

Activities B:

Task 1: Reporting the same sentence using different reporting verbs to express a different point of view towards what is being reported (i.e. committed, neutral, tentative) (S: pairs)

Task 2: Reading several sentences taken from different journal articles each with three reporting verbs underlined and choosing the one that expressed the point of view asked (i.e. committed, neutral, tentative). (S: individual)

Task 3: A text either brought by each participant or given by the teacher[1] will be read underlining the reporting verbs. Participants briefly discuss in pairs the use of reporting verbs in their texts. (S: individual or pairs)

3. Follow-up: Activities C

- Reading an extract of a review article and underlining the reporting verbs used. (S: individual)
- Filling in a table by classifying the reporting verbs from the previous activity into three categories according to the writers' point of view (i.e. committed, neutral, tentative). (S: individual)

4. Answering a short questionnaire (S: individual)

5. Homework

III. Schedule

1. Warm-up: Activities A (20 min.)

2. Lesson

- Explanation and discussion (15 min.)
- **Activities B**:
  Task 1. (10 min.)
  Task 2. (15 min.)
  Task 3. (15 min.)

3. Follow-up: Activities C (20 min.)

4. Short questionnaire (5 min.)

[1] Kotile, D.G. and R.A. Martin. 2000. Sustainable agricultural practices for weed control: implications to agricultural extension education. *Journal of Sustainable Agriculture*. 16.2: 31-34.

Unit 8 - Activities A
Answer sheets
(20 min.)

TEXT 8A-1

1. **Read the extract of a review article and <u>underline all the verbs</u> which show that the writers are going to report or make a summary of what other researchers wrote. Some verbs are used more than once. The first one is done for you.**

2. Improving the efficiency of utilisation from grassland feeds

The concentrations of CP [crude protein] in grazed grass, silage and grass hay are normally in the range 150-220, 100-160 and 80-120 g/DM [dry matter], respectively, varying seasonally, with N fertiliser rate, stage of maturity and the magnitude of losses during conservation. For grassland feeds with high CP contents this CP is broken down rapidly in the rumen, leading to high concentrations of rumen ammonia and low levels of undegraded dietary protein (UDP). Low supply of energy to the rumen often limits microbial protein (MP) synthesis, again restricting the supply of amino acids to grass-fed animals. These effects may be exacerbated in silage, because of the breakdown of true protein (TP) to free amino acids, peptides and ammonia which has already occurred in the silo and the removal during silage fermentation of most of the readily available energy in WSC [water-soluble carbohydrates]. Beever et al. (2000) **<u>noted</u>** that the yield of MP with silage varied from 13 to 28 g microbial N/kg organic matter apparently digested in the rumen for silages, compared with values of 33-58 for fresh forages.

There is more scope for increasing the efficiency of utilisation of CP in grass feeds by increasing MP rather than UDP. MP could be increased by improving the supply of readily available energy in feed and or by improving the synchrony in the supply of N and energy to rumen microbes. In temperate grasses the major source of readily available energy is from WSC with concentrations in fresh grasses varying from 50 to 350 g/kg DM. There are characteristic differences in WSC seasonally (low in autumn), with stage of growth (high during stem development) and between species (higher in ryegrass, particularly Italian ryegrass (*Lolium multiflorum*), than in other sown species). Humphreys (1989) demonstrated that WSC content is heritable and varieties of perennial ryegrass (*Lolium perenne*) have been bred with markedly enhanced WSC content. This would be expected to increase MP yield and improve animal performance. Miller et al. (1999) reported that milk yields were 3 kg/day higher for cows stall fed the high sugar ryegrass (Aberdove) (200 g WSC/kg DM) than normal ryegrass (AberElan) (130g WSC/kg DM), but there were also differences between the varieties in DM intake and digestibility.

The addition of readily available energy in sugar or starch to grass silages has had marked beneficial effects on MP supply and N retention by ruminants (Chamberlain et al., 1985; Huhtanen, 1998). Likewise the use of additives to restrict fermentation during ensiling and thus to retain WSC in the silage has resulted in an efficiency of MP synthesis

.../...

(cont.)

slightly higher than that of barn-dried hay made from the same crop (Jaakkola and Huhtanen, 1993). High retention of TP in the silage may also have contributed to efficient protein utilisation.

An alternative approach to improve N utilisation is to reduce the rate of protein breakdown and thus ammonia release in the rumen and achieve better synchrony in supply of N and energy to rumen microbes. For fresh grasses attention has centred on the possible use of grass with the 'green gene' mutation in which some of the normal senescence processes are inhibited. Such grasses may retain higher CP contents as they mature and Thomas (1987) demonstrated that the light harvesting chlorophyll protein content was maintained in the grass for 6 days after cutting, whereas there was a four-fold decline with normal grasses. It is, however, not clear whether these changes in protein structure result in improvements in protein utilisation in vivo with either fresh grasses or silages.

With silages, there are possibilities to change the composition of the CP through the use of additives. Bacterial inocula have been demonstrated to produce silages with higher proportions of TP than silages made without additive (Merry et al., 2000). This apparently arises from the inocula promoting rapid pH fall in the early stages of ensiling and thus reducing protease activity in the silo. Many studies, reviewed by Merry et al. (2000), have demonstrated improvements in animal performance with silages made with inoculant and Sharp et al. (1994) reported an improvement of 33% in the efficiency of microbial protein synthesis when silage made with inocula were compared with well preserved untreated silage. Additive containing formaldehyde or tannins can have profound effects on N in grasses, as discussed by Beever (1980), resulting in reductions in protein breakdown and ammonia release in the rumen. However, responses depend on the application rate used, and there is a substantial risk of 'over-protection' of protein with reduced in vivo digestibility and enhanced faecal loss.

High temperature dehydration of grasses reduces rumen ammonia concentrations compared with fresh or frozen grasses (Beever, 1980). This is associated with N solubility being reduced by high temperatures during drying. Beever (1980) noted substantial overall benefits from dehydration on N supply to the animal and attributed two-thirds of the increase to extra dietary protein escaping rumen degradation and one-third to improved MP production. This form of grass conservation is, however, unlikely to be widely adopted, because of high energy and capital costs.

There is potential to increase the efficiency of utilisation of N in grassland feeds by appropriate supplementation. Reference has already been made to responses to additional readily-available carbohydrate. In a recent experiment with cows grazing ryegrass swards, the provision of 8 kg/day of a *starch*-rich supplement with 135 g CP/kg DM compared with a supplement containing 210 g CP/kg DM was calculated to increase the efficiency of conversion feed N to milk from 0.12 to 0.20 (Gibb, M. J., personal communication). Valk (1994) has shown that the supplementation of grazed grass with maize silage improved milk protein output and halved the loss of N in urine (Table 2).

(Wilkins, R.J. and R. Jones. 2000. Alternative home-grown protein sources for ruminants in the UK. *Animal Feed Science and Technology*. 85.1-2: 24-26.)

2. **Now classify the verbs according to the writers' attitudes towards the research they are reporting. Complete the table below. The first one is done for you.**

Committed	Neutral	Tentative
	noted	

Unit 8
Reporting verbs

Aims

Unit 8 will discuss the use of different reporting verbs, a topic related to hedging, as ways of asserting the degree of the writer's commitment to what he/she is discussing.

In academic writing, reference to other researchers' work (such as books or journal articles) plays an important role. The writer may also report his/her own work. In journal articles, reference to previous research can be made by the use of 'reporting verbs' (see definition below). They can be mainly found in the Introduction and Discussion sections, where the writer usually makes reference to previous research. Textbooks for university students will frequently have nearly as many references to other academic texts as research articles. However, because emphasis in textbooks tends to be on established facts rather than new claims or controversial statements/theories, textbook writers, unlike research article writers, may present information without referencing the source (Hyland 1999: 15):

e.g. 'It was found that biological compounds could be synthetized in the laboratory using inorganic chemicals and ordinary chemical processes. Next, enzymes were extracted from yeast cell, and some steps of fermentation were carried out in vitro (Table 2.1) without the presence of living cell.'

(Mauseth, J.D. 1995. *Botany: an introduction to plant biology*. 2nd edn. Philadelphia: Sanders College Publishing: 16.)

'Contemporary studies indicate that primitive peoples in remote areas today recognize and have precise names for large numbers of plants in their local environment.'

(Jones, S.B. and A.E. Luchsinger. 1987. 2nd *Plant systematics*. edn. New York: McGraw-Hill: 11.)

1. Definition

A Reporting verb usually introduces a quotation or a summary of something said or written by another person.

Can you think of some examples of reporting verbs that you come across when reading in English?

2. Use

There are different patterns for making reference to previous research.

1. **Integral citations**

The name of the reported researcher appears in the reporting sentence
⇒ **author's surname** + date + **reporting verb** + information

e.g. 'In acarine systems, **Hoyt (1969)** **noted** that selectively spraying trees with the fruit thinner/insecticide carbaryl to only the upper and peripheral areas of apple trees conserved a population of the mite predator [...].'

(Lester, P.J., H.M.A. Thistlewood and R. Harmsen. 1998. The effects of refuge size and number on acarine predator-prey dynamics in a pesticide-disturbed apple orchard. *Journal of Applied Ecology*. 35: 324.)

OR

⇒ **author's surname + superscript or number** + **reporting verb** + information

'[...] **Asheshov *et. al.*[8] and Ward[9]** **showed** some protection against different bacterial infections in animals given very large doses of phage [...].' (reference to the authors/researchers)

(Barrow, P.A. and J.S. Soothill. 1997. Bacteriophage therapy and prophylaxis: rediscovery and renewed assessment of potential. *Trends in Microbiology*. 5.7: 268.)

2. **Non-integral citations**

The researcher's name appears in parentheses. In this case, there is frequently no clear reporting verb in the sentence. This seems to be the most common pattern in sciences → it focuses on what has been found.

⇒ information (with or without **reporting verb**) + **reference (author's surname + date).**

e.g. 'The importance of refuges in agricultural systems **had been highlighted** by the destruction of hedgerows and the correlated reduction in predaceous and parasitic insects in England earlier this century **(van Emden 1965)**.'

(Lester, P.J., H.M.A. Thistlewood and R. Harmsen. 1998. The effects of refuge size and number on acarine predator-prey dynamics in a pesticide-disturbed apple orchard. *Journal of Applied Ecology*. 35: 323.)

OR

⇒ information (with or without **reporting verb**) + **a superscript or a number in brackets**

e.g. 'Using an experimental mouse model, this infection could be prevented by parental phage inoculation[7].' (no reference to the author(s)/researcher(s))

(Barrow, P.A. and J.S. Soothill. 1997. Bacteriophage therapy and prophylaxis: rediscovery and renewed assessment of potential. *Trends in Microbiology*. 5.7: 268.)

e.g. 'Although only 10% to 15% of cases reported in Britain were found in sheep of more than four-and-a-half years old **(70, 71)**, it is possible that many older animals in the pre-clinical stage of infection were culled before the disease was detected **(16)**.' (references ordained alphabetically)

(Hoinville, L.J. 1996. A review of the epidemiology of scrapie in sheep. *Revue Scientifique et Technique, Office International des Epizooties*. 15.3: 829.)

3. Functions

1. To present information already published in the research area:

a) to report research and theories on the topic, already discussed and established in the scientific community;

b) to report on research and theories that are controversial. This indicates the usefulness of the present work:

- to fill the gap in knowledge – to research areas that have not yet been investigated;

OR

- to settle a disagreement by improving unsatisfactory research or theories.

2. To help the writer's line of argument and research:

a) to report other researchers/authors who have expressed the same view;

b) to report other researchers' results which agree, totally or partially, with the writer's results, or report other researchers/ authors' theories which predict that the writer's results should occur;

c) to report other researchers/authors in order to contradict their view, using this as a starting point to develop a new argument.

3. **To show the importance of reading the present text and show that the writer is an expert in the subject**:

   a) the writer shows that he/she is widely read on the topic;

   b) well-known researchers/experts do not need to report as much as less well-known writers;

   c) academic readers place a high value on shared knowledge through reference to the work of other researchers/ authors.

4. Types of reporting verbs

In academic writing, writers are expected not only to report other work but also to show their attitude towards what they report, i.e. whether they agree or disagree with the reported ideas and research.

The choice of a reporting verb may show the degree of the writer's commitment to (or detachment from) what is being reported and his/her point of view towards both the authors/researchers cited and the research being reported.

Table 1: A selection of reporting verbs.

Reporting verbs (writer's attitude)		
Committed	**Neutral**	**Tentative**
conclude	analyse	allude to
confirm	argue	assume
demonstrate (effect)	assess	attribute
establish (effect)	comment	believe
find (objective)	compare	consider
hold	complete	hypothesise
obtain (objective)	describe	indicate
point out	discuss	postulate
present evidence	document	propose
prove	evaluate	suggest
provide evidence	examine	
recognise	explain	
show (effect)	look at	
	note	
	observe (objective)	
	refer to	
	report	
	review	
	state	
	study	
	use	

Table 2: Examples of reporting verbs.

Attitude	Examples
Committed	'Khrbeet *et al.* (1994) and Thomas (1996b) all **demonstrated** clearly that post-fertilisation abortion of developing seeds can be a major factor contributing to reduced seed yield in the United Kingdom, even though such an effect seems to be smaller in New Zealand (Thomas, 1996b).' (Pasumarty, S.V. and R.G. Thomas. 1998. Limitations to seed set in white clover (*Trifolium repens* L.). IV. Effect of canopy density and artificial shading in the field. *Journal of Applied Seed Production*.16: 31.)
Neutral	'Evans (1997) **reviews** the effects of animals, mainly sheep and red deer, on erosion.' (Robinson, M., J. Boardman, R. Evans, K. Heppell, J. Packman and G. Leeks. 2000. Land use change. In Acreman, M. (ed.) *The hydrology of the UK: a study of change*. London: Routledge: 37.)
Tentative	'Brainerd and Fuchigami (1982) **suggest** that, in the case of apple plants produced *in vitro*, the inability of stomata to close is the main cause of rapid water loss following transfer to soil.' (introduction section) (Santamaria, J.M., W.J. Davies and C.J. Atkinson. 1992. Stomata of micropropagated *Delphinum* plants respond to ABA, CO_2, light and water potential, but fail to close fully. *Journal of Experimental Botany*. 44.258: 99.)

It should be noted that this evaluation may also be modified by the **verb tense** and **negation** (i.e. writing a negative sentence):

- **Verb tense**

There is a slight difference between the three tense options for reporting verbs: 'In general, a move from **past** to **present perfect** and then to **present** indicates that the research reported is increasingly *close* to the writer in some way: close to the writer's own opinion, close to the writer's own research, or close to the current state of knowledge.' (Swales and Feak 1994a: 184 - my underlining)

The use of present perfect in the following example indicates that ongoing research activity is being referred to and therefore the writer cannot yet take a clear position. Thus, the verb tense reinforces a neutral attitude.

e.g. 'In order to test the hypothesis that low water potential might sensitize the stomata to ABA, as **has been suggested** by Tardieu and Davies (1992), epidermal strips from N plants and MP plants growing on media 32 and 191 were exposed to a range of ABA concentrations of PEG.'

(Santamaria, J.M., W.J. Davies and C.J. Atkinson. 1992. Stomata of micropropagated *Delphinum* plants respond to ABA, CO_2, light and water potential, but fail to close fully. *Journal of Experimental Botany*. 44.258: 103.)

- **Negation**

The use of negation is not very common in hard sciences. However, when used it may express tentativeness or even disagreement in a polite way.

e.g. 'Note that although this conclusion extends Rawles's law of peoples in an important way, Rawles himself **does not seem to believe** that there are moral obligations to provide assistance to the poor in other countries.'

(Wesley, E. and F. Peterson. 1999. The ethics of burden-sharing in the global greenhouse. *Journal of Agricultural and Environmental Ethics*. 11: 186.)

NOTE: Tentativeness may be reinforced by **hedging** (see Unit 7).

Further reading:

Swales, J.M. and C.B. Feak. 1994a. *Academic writing for graduate students*. Ann Arbor, Michigan: The University of Michigan Press.

Swales, J.M.and C.B. Feak. 1994b. *Academic writing for graduate students: commentary*. Ann Arbor, Michigan: The University of Michigan Press.

Thompson, G. 1994. *English guides: reporting*. London: Harper Collins Publishers.

Other references:

Hyland, K. 1999. Talking to students: metadiscourse in introductory course books. *English for Specific Purposes*. 18.1: 3-26.

Hyland, K. 2000. *Disciplinary discourse: social interactions in academic writing*. Harlow: Longman: 20-40.

Swales, J.M. 1990. *Genre analysis: English in academic research settings*. Cambridge: Cambridge University Press.

Thomas, S. and T.P. Hawes. 1994. Reporting verbs in medical journal articles. *English for Specific Purposes*. 13.2: 129-148.

Thompson, G. and Y. Ye. 1991. Evaluation in the reporting verbs used in academic papers. *Applied Linguistics*. 12.4: 365-382.

Thurston, J. and C.N. Candlin. 1998. Concordancing of vocabulary of academic English. *English for Specific Purposes*. 17.3: 267-280.

Unit 8 – Activities B
Reporting verbs
(40 min.)

TEXTS 8B-1

1. Read the following sentences taken from two journal articles and complete the task on the answer sheets provided. (pair work: 10 min.)

1.1	With some adaptations, sub-irrigation could be used commercially to produce vegetable seedlings, with economic environmental benefits, such as the reduction of nitrogenous run-off. (Ahmed, A.K., G.C. Cresswell and A.M. Haigh. 2000. Comparison of sub-irrigation of tomato and lettuce seedlings. *Journal of Horticultural Science & Biotechnology*. 75.3: 354.)
1.2	Over the past decade, economists' ideas about public goods, market failure, crowding out and the marginal excess-burden of taxation have strongly influenced changes in the role and delivery of government-funded agricultural extension in Australia. (Marsh, S.P. and D.J. Pannell. 1999. Agricultural extension policy and practice in Australia: an overview. *The Journal of Agricultural Education and Extension*. 6.2: 83.)

TEXTS 8B-2

2. Read the following sentences taken from different journal articles and complete the task on the answer sheets provided. (individual work: 15 min.)

Table 1

2.1	Moreng and Shaffner (1951) **assumed** / **found** / **noted** that an incubation temperature of 43.3°C killed 4 d [days] embryos after 10 min exposure, whereas embryos at 1 d or over 7 d of age were able to survive this temperature for up to 8 h exposure. (French, N.A. 2000. Effect of short periods of high incubation temperature on hatchability and incidence of embryo pathology of turkey eggs. *British Poultry Science*. 41.3: 377.)
2.2	Baillie and Myers (1991) also **argued** / **hypothesised** /**concluded** that the performance of the more sophisticated GARCH [a multivariate generalised autoregressive conditional heteroscedasticity model] approach to hedging varies from contract to contract. (Dawson, P.J., A.L. Tiffin and B. White. 2000. Optimal hedging ratios for wheat and barley at the LIFFE: a GARCH approach. *Journal of Agriculture Economics*. 51.2: 149.)

Table 1 (cont.)

2.3	Asher & Williams (1996) **<u>demonstrated</u>** / **<u>hypothesise</u>** / **<u>refer to</u>** a negative correlation between the number of frost days in February and March and the level of infection in August. (Scott, R.K. and K.W. Jaggard. 2000. Impact of weather, agronomy and breeding on yields of sugarbeet grown in the UK since 1970. *Journal of Agricultural Science*. 134: 346.)
2.4	A review of the literature covering a wide range of crops also **<u>looked at</u>** / **<u>postulated</u>** that / **<u>showed</u>** that the level of irrigation, nitrogen fertilizer, thinning (or crop load) and other orchard management factors affect the incidence of some types of fruit cracking and other quality attributes of several apple cultivars (Opara *et al.* 1997b). (Opara, L.U., A.J. Hodson and C.J. Studman. 2000. Stem-end splitting and internal ring-cracking of 'Gala' apples as influenced by orchard management practices. *Journal of Horticultural Science & Biotechnology*. 75.4: 465.)

Table 2

2.5	Miller and Rich (15) **<u>established</u>** / **<u>indicated</u>** / **<u>reported</u>** that an autumn application of 0.17 metric tons of lime per hectare caused a reduction of 7.32, and 56% in the number of ascopores discharged in April, early May, and late May, respectively of the following year. (Spotts, R.A., L.A. Cervantes and F.J.A. Niederholzer. 1997. Effect of dolomitic lime on production of asci and pseudothecia of *Venturia inaequalis* and *V. pirina*. *Plant Disease*. 81.1: 97.)
2.6	Ketelaar-de Lauwere et al. (1998) **<u>observed</u>** / **<u>proved</u>** / **<u>suggested</u>** that free traffic significantly reduces attendance at a simulated AMS [Automatic Milking System]. (Millar, K.M. 2000. Respect for animal autonomy in bioethical analysis: the case of Automatic Milking System (AMS). *Journal of Agricultural and Environmental Ethics*. 12: 47.)
2.7	However, other vehicles of transmission **<u>have been alluded to</u>** / **<u>have been established</u>** / **<u>have been described</u>** and include person-to-person contact and consumption of vegetables (3), untreated water (drinking water and lake water) (48), and unpasteurized milk and apple cider (10), as well as swimming in freshwater lakes (1). (Lisle, J.T., S.C. Broadway, A.M. Prescott, B.H. Pyle, C. Fricker and G.A. McFeteres. 1998. Effects of starvation on physiological activity and chlorine disinfection resistance in *Escherichia coli* O157:H7. *Applied and Environmental Microbiology*. December: 4658.)
2.8	Matthews (1993) **<u>considered</u>** / **<u>held</u>** / **<u>stated</u>** that practical experience has shown that reduced levels of illumination reduce the flightness of deer during handling. (Weeks, C.A. 2000. Transport of deer: a review with particular relevance to red deer (*Cervus elaphus*). *Animal Welfare*. 9: 69.)

Table 3

2.9	Nevertheless, he [Rawls] **argues** / **believes** / **pointed out** that well-ordered societies do have obligations to assure that human rights are universally respected and that 'basic human needs' are satisfied (p. 75). How this is to be accomplished is not described. (Wesley, E. and F. Peterson. 1999. The ethics of burden-sharing in the global greenhouse. *Journal of Agricultural and Environmental Ethics*. 11: 185.)
2.10	Buchan *et al.* **concluded** / **explained** /**suggested** that the overestimation of clay was because of a greater X-ray attenuation by smaller particle sizes as a result of their greater iron concentration. This is an appealing hypothesis, but, as far as we are aware, no one has tested it by comparing pipette analysis with X-ray sedimentation on samples of soil containing little iron. (Watts, C.W., W.R. Whaley, N.R.A. Bird and M.R. Ashman. 2000. The effect of iron concentration, hindered settling, saturation cation and aggregate density of clays on the size distribution determined by gravitation X-ray sedimentometry. *European Journal of Soil Science*. 51: 305.)
2.11	Several robust estimators **have been proposed** / **have been recognised** / **have been studied**, although only one (Cressie & Hawkins, 1980) has received any attention in the soil science literature. (Lark, R.M. 2000. A comparison of some robust estimators of the variogram for use in soil survey. *European Journal of Soil Science*. 51: 138.)
2.12	The secondary process might represent genuine observations. McBratney & Webster (1986) **considered** / **referred to** / **pointed out** the case of potassium in pasture soil where there is continuous variation (comparable to the process with distribution V) but also a quasi-point process (faecal deposits). (Lark, R.M. 2000. A comparison of some robust estimators of the variogram for use in soil survey. *European Journal of Soil Science*. 51: 138.)

TEXTS 8B-3

3. Read the text you brought to the lesson (if you did not bring a text please ask for one) and **highlight/underline** the reporting verbs used. Discuss briefly with your neighbour the use of reporting verbs in your text. (individual or pair work: 15 min.)

TEXTS 8B-3

3. Read the following Introduction taken from a journal article and **highlight/ underline** the reporting verbs used. Discuss briefly with your neighbour the use of reporting verbs in your text. (individual or pair work: 15 min.)

Introduction

Sustainable agriculture has captured the attention of policy-makers and development agencies. Sustainability is now being encouraged in all aspects of development. Several investigators have defined sustainable agriculture (Ikerd, 1991; Allen et al., 1991; Caldwell, 1994; Crosson, 1992). While each definition of sustainable agriculture is site specific and differs from region to region, investigators have yet to agree as to what actually they mean by sustainable agriculture.
For the purpose of this study the authors favoured the definition of sustainable agriculture given in the Food, Agriculture, Conservation, and Trade Act of 1990 and is stated as:

> Sustainable agriculture is an integrated system of plant and animal production practices having a site specific application that will, over the long-term satisfy human food and fiber needs, enhance environmental quality and natural resource base upon which the agriculture economy depends, make the most efficient use of non-renewable resources, and on-farm/ranch resources and integrate, where appropriate, natural biological cycles and controls, sustain the economic viability of farm/ranch operations and enhance the quality of life for farmers/ranchers and society as a whole . (US. Congress, 1900, p. 3)

Young et al. (1990) questioned the standard set of criteria for classifying farmers into either conventional or sustainable categories. Their study indicated that previous classifications used were related to the number of acres farmed, net income per acre, views on farm policy, and the number of organizational memberships. Harrington (1995) grouped each of the definitions into categories of agroecology, ethics and sustainable growth.

The study conducted at Northwest Area Foundations (NAF) by Gardner et al. (1995) considered sustainable farmers as those who reduce dependency on synthetic, commercially produced fertilizers and pesticides in order to develop positive ecological practices like crop rotations and livestock integration. While farmers have had various reasons for adopting sustainable agriculture practices, a majority of them in the surveyed area (Iowa, North Dakota, Minnesota and Montana) were influenced by economic, environmental and health concerns (Bultena et al., 1995).

Many studies (Taylor et al., 1989; Bird et al., 1995; Hanson et al., 1995) concluded that most farmers have had problems in controlling weeds. The methods of

…/…

(cont.)

weed control range from physical control methods (machine tillage, mowing, hoeing, etc.), cultural control methods which include any management practice that enhances a crop's ability to compete with weeds (crop interference, fertilizer placement, timing of planting, crop rotation, etc.), biological control methods (use of biotic organisms to control weeds), and chemical weed control (use of organic and inorganic compounds to disrupt plant growth) (Aldrich & Kramer, 1997; Forcella & Burnside, 1994). Weed species do change and certain management practices affect the weed flora in general. For instance cropping practices (types of crops, life cycles of crops and weeds, competitive ability of different crops), cropping patterns (monocrop, multicrop, spacing and density crops), and weed control methods used could shift weed populations. No single method will control all weeds, because the repeated use of one method permits a build up of species not being controlled (FAO, 1986).

In the recent years chemical control of weeds has become a dominant method of weed control. The use of effective and reliable herbicides has come to dominate the management decision of a majority of farmers in Iowa leading to abundant food production. However, the heavy use of these chemicals has had a negative impact on the environment and human health (Bridges, 1994; Forcella, 1988; Weinberg, 1990).

Hanson et al. (1995) reported that sustainable farmers mainly used cultivation, cover crops, mowing and crop rotation as the main methods of weed control. About one-third of these farmers banded their herbicides while over half of them used a rotary hoe. Weed control in a sustainable environment proved difficult and a majority of sustainable farmers believed weed problems would remain the same (Taylor et al., 1989; Bultena et al., 1995; Jamtgaard, 1995; Hanson et al., 1995).

Other studies conducted in Iowa, Dakota, Minnesota, and Montana confirmed that the uses of sustainable practices have had a positive effect on the environment (Bird et al., 1995). Farmers make critical decisions on which crops and animals to produce, how many inputs to use, what type of tillage practices to use, how to control weeds and other pests, what machinery and supplies to purchase, and how to supply labor. With all these variations in agricultural activities, it is not easy to distinguish the practices that are considered sustainable or what constitutes sustainability. Farmers in Iowa used chemical, physical and cultural methods of weed control, however, it is not clear whether some agricultural practices are used for the purpose of weed control.

It is interesting to note in particular whether farmers in Iowa are actually using sustainable agricultural practices for weed control and find out what management approaches are required in order to adopt sustainable agricultural practices associated with weed control. An important component in the educational programs is to make farmers aware of the need of these educational programs. The specific educational needs for farmers have to be understood by Extension educators so as to work with sustainable agriculture farmers (Hanson et al., 1995). Educational approaches can be identified that would facilitate the development of the programs and strengthen the growth of sustainable agriculture.

.../...

(cont.)

The objectives of this study were to:

1. Identify farmers' use of selected sustainable agriculture practices associated with weed control.
2. Determine the level of interest by farmers about learning sustainable agriculture practices associated with weed control.
3. Identify the demographic characteristics and conduct comparisons with selected variables in the study.

(Kotile, D.G. and R.A. Martin. 2000. Sustainable agricultural practices for weed control: implications to agricultural extension education. *Journal of Sustainable Agriculture*. 16.2: 31-34.)

Unit 8 - Activities B
Answer sheets
(40 min.)

TEXTS 8B-1

1. Complete the table below with suitable <u>reporting verbs</u>.

You are reporting to someone what these researchers wrote but you are going to present your point of view on each statement in three different ways. Choose a verb for each of the options (i.e. committed, neutral and tentative). (pair work: 10 min.)

1.1

<table>
<tr><td colspan="3">Ahmed, Cresswell and Haigh (2000)…</td></tr>
<tr><td>Committed</td><td></td><td rowspan="3">…that with some adaptations, sub-irrigation could be used commercially to produce vegetable seedlings, with economic environmental benefits, such as the reduction of nitrogenous run-off.</td></tr>
<tr><td>Neutral</td><td></td></tr>
<tr><td>Tentative</td><td></td></tr>
</table>

1.2

<table>
<tr><td colspan="3">Marsh and Pannell (1999)...</td></tr>
<tr><td>Committed</td><td></td><td rowspan="3">…that over the past decade, economists' ideas about public goods, market failure, crowding out and the marginal excess-burden of taxation have strongly influenced changes in the role and delivery of government-funded agricultural extension in Australia.</td></tr>
<tr><td>Neutral</td><td></td></tr>
<tr><td>Tentative</td><td></td></tr>
</table>

TEXTS 8B-2

2. Each sentence has three reporting verbs. Choose the correct verb according to what is asked in the tables below. The first one is done for you. (plenary: 15 min.)

Table 1: Choose a reporting verb which expresses a more **committed** attitude.

Sentence number	Reporting verb
2.1	**found**
2.2	
2.3	
2.4	

Table 2: Choose a reporting verb which expresses a **neutral** attitude.

Sentence number	Reporting verb
2.5	
2.6	
2.7	
2.8	

Table 3: Choose a reporting verb which expresses a **tentative** attitude.

Sentence number	Reporting verb
2.9	
2.10	
2.11	
2.12	

Unit 8 - Activities C
Answer sheets
(20 min.)

TEXT 8C-1

1. Read the extract of a review article and underline all the reporting verbs. Some reporting verbs are used more than once. One is done for you.

Aetiological controversy

Early observation on the occurrence of scrapie in flocks that had previously been free of disease, after the introduction of affected animals, suggested that scrapie could be a contagious disease (64). A contagious disease is defined as a condition caused by an infectious agent, which can be transmitted from infected to uninfected animals.

This theory was supported by the experimental transmission of infection to sheep in 1936 (10) and to goats in 1939 (11). In the 1950s it was shown that scrapie was caused by a filterable, self-replicating agent (86, 93). In the early 1960s the disease was transmitted to various experimental animals (6, 97).

But the study of scrapie has been complicated by the fact that an infectious agent has never been isolated, by the long incubation period between infection and the onset of clinical signs of disease, and by the problem of detecting animals which are pre-clinically infected. As a result the aetiology of scrapie has been a subject of controversy for many years.

Despite the experimental evidence that scrapie was an infectious condition, some of those working with the disease in the 1960s believed that scrapie was an inherited condition. The variation in the incidence of scrapie between different breeds of sheep, and especially between different families, suggested a genetic influence on the occurrence of the disease.

[...] Stronger evidence for a genetic influence was provided by the variation in the incidence of disease among different families within affected flocks (71). This was further supported by experimental evidence for a variation in the incidence of scrapie among families of sheep after inoculation with SSBP/1 (39).

These findings led some of those investigating the disease in the 1960s **to believe** that scrapie was an autosomally recessive inherited condition, which could be transmitted experimentally but which could not be transmitted from an affected animal to an unaffected animal, except by inoculation (71). This belief was based on the following three pieces of evidence. First, the pattern of disease occurrence in naturally affected flocks and in experimentally inoculated animals was shown to be similar to that of an autosomally recessive condition (39, 71, 72). Secondly, it was shown that epidemics of a genetically transmitted disease could, theoretically, occur after the introduction of infected animals (25). Finally, some of the early attempts to introduce

.../...

(cont.)

the disease to unaffected flocks, by transferring animals from affected flocks or exposing healthy animals to infected stock, gave negative results (71, 74, 86).

However, Parry demonstrated the autosomal recessive pattern of inheritance by investigating the occurrence of scrapie in commercial flocks (72). It has been suggested that there may have been considerable misclassification of animals in these flocks, due to the culling of infected animals before the onset of clinical signs of disease. It was also suggested that the allocation of a presumed genotype to animals on the basis of the presence or absence of scrapie in their progeny gave rise to a circular argument. Dickinson *et al.* presented further evidence on the occurrence of scrapie in affected flocks which was not consistent with either recessive or dominant genetic transmission (17). Both Parry and Draper assumed that animals carrying the scrapie-susceptible allele were likely to be of superior conformation and so would be given preference in the selection of flock replacements (25, 72). They suggested that this would account for the deviance from the expected pattern for an autosomal recessive condition, but this assumption has been questioned (95).

In the experimental work of Gordon, the autosomal recessive pattern of susceptibility to inoculation with SSBP/1 did not occur in all breeds. He suggested that this may be due to errors in the recording of relationships or incomplete penetration or dominance of the genetic effect (39).

The transmission of infection from affected to unaffected animals provides the strongest evidence that scrapie is a contagious disease and not an inherited condition. The studies referred to earlier, which failed to demonstrate the spread of disease, did not take into account the need for long observation periods.

The studies that have shown that scrapie can be transmitted from affected sheep to unaffected sheep, with no inoculation of infected tissue, are listed in Table 1. The studies conducted by Brotherston *et al.* in 1968 (1) Dickinson *et al.* in 1974 (21) and Hourrigan *et al.* in 1979 (48) are the most reliable, as these researchers ensured that exposed animals were very unlikely to be incubating the disease before exposure, and examined all exposed animals pathologically to confirm the occurrence of scrapie. For example, the study of Dickinson *et al.* exposed sheep from a large isolated flock that had been free of scrapie for at least twelve years (21). The remaining studies listed in Table 1 provide some evidence for the transmission of infection but could be criticised, as it is possible that the animals involved were pre-clinically infected before exposure to infected animals.

The occurrence of scrapie in a goat born into a flock of sheep with a high prevalence of scrapie in 1940 provided strong evidence for the spread of the disease, as scrapie is rarely reported in goats (8). There have been several reports of the occurrence of the disease in goats kept in contact with affected sheep (1, 48, 84, 85, 87, 91).

Most experts now recognise scrapie as an infectious condition which can be transmitted from affected to unaffected animals.

(Hoinville, L.J. 1996. A review of the epidemiology of scrapie in sheep. *Revue Scientifique et Technique, Office International des Épizooties.* 15.3: 829-830; 832.)

2. Now classify the verbs according to the writer's attitudes towards the research they are reporting. Complete the table below. The first one is done for you.

Committed	Neutral	Tentative
		believe

Unit 9 - Plan
Thesis statement and topic sentences

I. Aims

Unit 9 will be concerned with how thesis statements and topic sentences may help structure discourse and ideas across the text and thus lead the reader through the text.

II. Methodology and materials

1. Warm-up: Activities A

- Reading the introduction of a journal article and choosing an appropriate title from five given alternatives. Underlining the sentence that helped in their choice. (S: individual)
- Identifying the topic or main idea of each paragraph. Underlining the topic sentence of the paragraphs. (S: individual)

2. Lesson

- Checking the answers to Activities A (key is given). (S/T)
- The unit handout will be distributed and briefly commented on: explaining how thesis statement and topic sentences in a text can increase text readability and clarity. (T)
- Participants are given the title of a journal article and four sentences taken from the introduction. Participants choose which sentence contains the thesis statement for this article. (S: plenary)

Activities B:

Task 1: Summarising the main idea of a popular article after reading the first sentence of each paragraph. Deciding whether to read the rest of the text to help preparation of a talk on a given topic. (S: pairs)

Task 2: Deciding whether each of five paragraphs has a topic sentence and underlining the topic sentence if the paragraph has one. (S/T: plenary)

Task 3: Reordering paragraphs taken from a journal article introduction and choosing the paragraph which contains the thesis statement. (S: pairs)

Task 4: Identifying the thesis statement and topic sentences (of the first four paragraphs) of the journal article brought by each participant. In case they did not bring one, a text will be supplied[1]. (S: individual)

3. Follow-up: Activities C

- Reading the introduction of a journal article and choosing an appropriate title from five given alternatives. Underlining the sentence that helped in their choice. (S: individual)
- Identifying the topic or main idea of each paragraph. Underlining the topic sentence of the paragraphs. (S: individual or pairs)

4. Answering a short questionnaire (S: individual)

5. Homework

III. Schedule

1. Warm-up: Activities A (20 min.)

2. Lesson

- Explanation and discussion (15 min.)
- **Activities B**:
  Task 1. (15 min.)
  Task 2. (5 min.)
  Task 3. (10 min.)
  Task 4. (15 min.)

3. Follow-up: Activities C (20 min.)

4. Short questionnaire (5 min.)

---

[1] Phillips, C.J.C., I.D. Morris, C.A. Lomas and S.J. Lockwood. 2000. The locomotion of dairy cows in passageways with different light intensities. *Animal Welfare*. 9: 421, 422, 429, 430.

Unit 9 – Activities A
Answer sheets
(20 min.)

TEXT 9A-1

1. Read the introduction of a research article and answer the two questions below.

Introduction

Potato production in North Carolina is located primarily in the northeastern part of the state. Potatoes are planted in early March and harvested in late June and early July to meet a market window and avoid high summer temperatures. Eighty percent of these potatoes are grown for processing into potato chips. The three main varieties currently grown are Atlantic, Superior, and Snowden. There are approximately 9000 ha planted per year with average yields of 22.4 T/ha.

In 1995, a survey of ten commercial production fields revealed that plant population averaged only 67% of desired populations. In 1996, a more comprehensive survey was conducted to determine the primary cause of reduced stands. Through this survey, it was determined that low stands were attributable to irregular placement of seedpieces and lower than desired populations being planted.

Inadequate plant stands can significantly reduce yield and economic return per hectare (Schotzko *et al.*, 1984). Seedpiece spacing and population studies have been conducted on many different varieties with mixed results. In general, total yields increased as seedpiece spacing decreased (Bishop and Wright, 1959; Entz and LaCroix, 1984; Nelson, 1970; Schotzko *et al.*, 1984). However, varieties differ in their ability to compensate for wide gaps and reductions in populations. For example, total tuber yield of Russet Burbank potatoes was not affected by changing in-row spacing from 15 to 30.5 cm, or from increasing the percentage of doubles from 0 to 60% (Halderson *et al.*, 1992). Rupp and Thornton (1992) found differences in response to spacing irregularities among three varieties examined in Washington. There was little reduction in the economic return to growers when percent stand was reduced for Russet Norkotah. However, a reduction of stand from 100% to 50% or 60% resulted in a sizeable reduction in economic return with Russet Burbank. Of seven potato varieties tested in Oregon, only Atlantic demonstrated reduced total yield at low populations (Rykbost and Maxwell, 1993). In that study, optimum seedpiece spacing for Atlantic was 17 cm. In a study by DeBuchananne and Lawson (1991), Atlantic potatoes produced significantly higher total tuber yields when produced at 15 cm rather than 31 or 46 cm spacing.

The cultivar Atlantic also exhibits internal heat necrosis and hollow heart, especially as tuber size increases. The most effective management strategy that can be used by growers to reduce internal heat necrosis is to reduce tuber size by increasing

.../...

(cont.)

plant populations (Sterrett, 1997). Narrow seeding spacing generally yields smaller tubers (Rex, 1990; Rex, 1991; Iritani *et al.*, 1972) and can reduce the incidence of hollow heart (Rex *et al.*, 1987; DeBuchananne and Lawson, 1991). Research on how Snowden and Superior respond to irregularities in spacing and reductions in populations has not been conducted.

The objectives of this study were to evaluate the effect of seedpiece spacing and varying populations on yield and internal quality of three predominant varieties grown in Eastern North Carolina: Atlantic; Superior; and Snowden. An economic analysis based on seed costs and yields for the various spacing configurations, was also conducted.

1.1 Choose the most appropriate title for the article. Tick (✓) one box.

Influence of seedpiece population on yield, internal quality, and economic value of Atlantic, Superior, and Snowden potato varieties in Eastern North Carolina	
Influence of seedpiece population on yield, internal quality, tuber size and economic performance of Atlantic, Superior, and Snowden potato varieties in Eastern North Carolina	
Influence of seedpiece spacing and population on yield, internal quality, tuber size and economic value of Atlantic, Superior, and Snowden potato varieties in North Carolina	
Influence of seedpiece spacing and population on yield, internal quality, and economic performance of Atlantic, Superior, and Snowden potato varieties in Eastern North Carolina	
Influence of seedpiece spacing and population on yield, internal quality, and economic performance of Atlantic, Superior, and Snowden potato varieties in North Carolina	

1.2 Underline the sentence or sentences which helped you to choose the title.

TEXTS 9A-2

2. Read the following paragraphs and answer the two questions below.

Paragraph 1

Soil acidity can be measured as the acidity (pH) of water in equilibrium with the soil. For mineral soils it ranges between 3.6 and 9.0. Values between 5.5 and 7.5 are most common for agricultural land, and phosphate is most readily available in this pH range. The water solubility of aluminium (a major component of clay particles) increases with increasing soil acidity. Aluminium reduces phosphate availability and is toxic to most crops, but some plantation crops (e.g. tea, rubber trees) tolerate quite acidic conditions, down to pH 4.0.

(Lægreid, M., O.C. Bøckman and E.O. Kaarstad. 1999. *Agriculture, fertilizers and the environment*. Wallingford: CABI Publishing/ CAB International: 92.)

Paragraph 2

The discoveries of the use of plants for food and later as medicine began at a very early stage in human evolution. Prehistoric people knew and used nearly all the important crop plants that we cultivate today. Food gatherers modified wild species by selecting plants with such features as tastiness in vegetables or higher yield in grains. Contemporary studies indicate that primitive peoples in remote areas today recognize and have precise names for large number of plants in their local environment. Some of these peoples regularly use plants for fish or arrow poisons, others for drugs to treat wounds or sickness, and still others for narcotic or hallucinatory purposes. Classification by preliterate people is at least partly based on the usefulness and harmful properties of plants. These groupings often parallel current classification concepts and have been referred to as *folk taxonomies*; that is, classifications that developed within the society through the need of the society and without scientific efforts (Berlin, Breedlove, and Raven, 1973).

(Jones, S.B. and A.E. Luchsinger. 1987. *Plant systematics*. 2nd edn. New York: McGraw-Hill: 11.)

Paragraph 3

The belief that trees are always benign elements in the farming landscape is also a myth. Trees can compete with crops for light and nutrients, causing significant reductions in crop yields. They can spread as weeds, ruining the land for grazing or crops. They can lower the water table, causing wells and water-holes to dry up. Poorly designed windbreaks can cause funnelling of winds, increasing plant damage and soil erosion. Equally ill-chosen or badly positioned trees on hillsides can increase erosion. They can harbour tsetse fly and highly destructive pests such as the *Quelea* bird.

(Food and Agriculture Organization of the United Nations. 1993. *The challenge of sustainable forest management: what future for the world's forests?* Rome: FAO: 45.)

Paragraph 4

A few decades ago, meteorologists believed that the Bergeron process was responsible for the formation of most precipitation except for light drizzle. Later, it was discovered that copious rainfall is often associated with clouds located well below the freezing level (called *warm clouds*), especially in the tropics. Clearly a second mechanism also must trigger precipitation. Researchers discovered the collision-coalescence process.
(Lutgens, F.K. and E.J. Tarbuck. 1998. *The atmosphere*. 7th edn. London: Prentice-Hall International, Inc.: 118.)

2.1 What is each paragraph about? Answer in the box provided. The first one is done for you.

Paragraphs	**The paragraph is about....**
1	**Soil acidity**
2	
3	
4	

2.2 Underline the sentence in each paragraph that gives the main idea of the paragraph. The first one is done for you.

Unit 9
Thesis statements and topic sentences

Aims

To focus on sentences that will give you the 'controlling idea(s)' (= ideas that control the other ideas of the text) of either the whole text or a part of it. Finding these sentences may help you to understand better and quicker what an academic text is about. In this unit we will concentrate on:

a) the thesis statement or the main argument of the text (whole text);

b) topic sentences of paragraphs (part of a text).

Some parts of a text are more important than others for both writers and readers. Writers want to emphasise some parts of their text. On the other hand, we, as readers, also see some parts of a text as being more important than others.

One of the most important parts of the complete text is where the writer tells us about the main idea. Also, when reading the text in more detail, another important part is when the writer tells us about the main idea of a paragraph.

1. Definitions

Thesis statement – The sentence(s) that tells/tell you what the main claim (= what the writer wants the readers to believe) or main point of a journal article is. This claim may be a finding or a theory. (see example below)

Because the writer has to **present evidence** to make readers in the academic community believe in his/her main claim, the thesis statement 'controls' and structures the text.

The thesis statement usually appears in the introduction (usually in the last few paragraphs) and the discussion (or conclusion) of the text. However, not all journal articles have a thesis statement explicitly stated. Sometimes it is in different parts of the text.

Topic sentence – The sentence which tells us either what a whole paragraph is about or what the main idea of the paragraph is (i.e. topic, purpose or main idea).

Sometimes in English texts it is possible to say what the paragraph is about just by reading the first and/or the final sentence of a paragraph. However, many well-written paragraphs do not have explicit topic sentences. This means that the topic, purpose or main idea of the paragraph is implied and not clearly stated.

The topic sentence performs the same function for the paragraph as the thesis statement does for the text.

In textbooks, the title of a section or subsection also functions as a topic sentence, since it clearly states what the next section or subsection is about.

2. Examples

Thesis statement

In the journal article entitled 'A comparison of some concentrate feed ingredients in cattle and sheep' the thesis statement can be found in the Introduction and the Discussion sections.

Introduction:

'The objective of this study was to determine the digestibility of a selection of concentrate feeds in cattle and sheep.'

⇓

Research question(s): How do sheep digest concentrate feeds?
AND/OR
How do cattle digest concentrate feeds?

Conclusion:

'This study does not support the contention that sheep are better digesters of concentrates than cattle, or that cattle digest high-fibre feeds better than sheep while the opposite occurs with low-fibre feeds.'

(O'Mara, F.P., J.E. Coyle, M.J. Drennan, P. Young and P.J. Caffrey. 1999. A comparison of some concentrate feed ingredients in cattle and sheep. *Animal Feed Science and Technology* 81: 168, 172.)

Topic sentence

- First sentence

> **Mean**
>
> 'The mean (denoted $\bar{Y}$ and also referred to as the arithmetic mean) is the average value of the data. It is obtained from the sum of all the data values divided by the number of observations (in symbolic terms, $\sum Y/n$). The mean is a good measure of the centre of symmetrical frequency distributions. It uses all of the numerical values of the sample and therefore incorporates all the information content in the data. However, the value of a mean is greatly affected by the presence of outliers. The arithmetic mean is a widely used statistic, but there are situations when you should be careful about using it (see Box 39.2 for examples).'
>
> (Jones, A., R. Duck, R. Reed and J. Weyers. 2000. *Practical skills in environmental science*. Harlow: Prentice Hall: 210.)

- Final sentence

> 'In still air, two factors, temperature and density, largely determine the amount of pressure that a particular gas exerts.[1] Let us first examine the effect of temperature on air pressure when density is kept constant. We do so by observing the behavior of a gas in a closed container (a constant volume). When the density is kept constant and the temperature of the air is raised, the speed of the gas molecules increases, and hence their force. From this observation, we conclude that in a closed container, an increase in temperature results in an increase in pressure.'
>
> (Lutgens, F.K. and E.J. Tarbuck. 1998. *The atmosphere*. 7th edn. London: Prentice-Hall International, Inc.: 137.)

3. Reasons for a thesis statement

Reading the introduction and the discussion (or conclusion) of a journal article helps you to find out:

- a statement of the problem presented and its resolution;
- what kind of evidence supports the thesis statement.

In the **introduction** the thesis statement usually appears as:

- a research question, a problem, an hypothesis or the statement of the purpose of the study.

In the **discussion** the thesis statement usually appears as:

- an answer or a solution to the research question, problem or hypothesis

Closely related to the thesis statement is the **title** of the journal article.

A common pattern is therefore that one sentence (sometimes more than one) in the introduction presents the research question, problem or hypothesis and one sentence (sometimes more than one) in the conclusion section states the answer and these sentences are closely linked to the title of the journal article.

4. Reasons for topic sentence

- It can help the reader to see what kind of evidence supports the main idea of the paragraph.
- It can help the reader to distinguish the main idea and the supporting details.
- Reading the first and/or last sentence of each paragraph in a text is a quick way to read the text and know what the text is about. This can help you decide whether to read the text in detail or not.

Read the title of a journal article below and then choose the sentence (a-d) from the introduction which you consider the thesis statement:

Title: 'Comparison of sub-irrigation and overhead irrigation of tomato and lettuce seedlings'

Sentences:

a) Sub-irrigation may reduce fertilizer use and prevent pollution caused by nutrient- rich leachate from over-head irrigation systems.

b) There are conflicting reports of growth increase due to sub-irrigation.

c) We conducted an experiment to compare the growth of tomato and lettuce seedlings under sub-irrigation and overhead irrigation, and to examine the effects of the application rate of controlled release fertilizer.

d) Overhead irrigation is widely used for seedling vegetable production in nurseries in Australia (Huett, 1997) and the US (Leskovar, 1998), yet this method can be highly wasteful of water and nutrients (Rolfe *et al.*, 1994).

(Ahmed, A.K., G.C. Cresswell and A.M. Haigh. 2000. Comparison of sub-irrigation of tomato and lettuce seedlings. *Journal of Horticultural Science & Biotechnology*. 75.3: 350.)

Further reading:

Björk, L. and C. Räisänen. 1996. *Academic writing: a university writing course*. Lund, Sweden: Studentlitteratur.

Smith, M. and Smith, G. 1990. *A study skills handbook*. Oxford: Oxford University Press.

Other references:

Booth, W.C., G.G. Colomb and J.M. Williams 1995. *The craft of research*. Chicago: The University Chicago Press.

Grellet, F. 1981. *Developing reading skills.* Cambridge: Cambridge University Press.

Mauranen, A. 1993. *Cultural differences in academic rhetoric: a textlinguistic study.* Frankfurt am Main: Peter Lang.

Richards, J.C., J. Platt and H. Platt. 1992. *Dictionary of language teaching and applied linguistics.* Harlow: Longman.

Willcocks, K. 2000. Argument in academic writing and the case of the 'thesis statement' in the introductions and conclusions of published articles and MSc dissertations in the field of applied linguistics. Unpublished MSc dissertation. University of Edinburgh.

Unit 9 – Activities B
Thesis statement and topic sentence
(45 min.)

TEXT 9B-1

1. Imagine you have to give a talk on the use of genetic engineering to protect crops from diseases. You have found an article called 'Making rice disease-resistant' in the journal *Scientific American*. You need to find out quickly if it is relevant for your topic, so you scan the article, reading the first sentence of each paragraph only.

Below is a list of the first sentence of each paragraph of the article. Read them and answer the questions on the answer sheets provided. (pair work: 15 min.)

1. Rice is arguably the world's most important food.
2. These bacteria – *Xanthomonas oryzae pv. Oryzae* (known as Xoo) – spread rapidly from rice plant to rice plant and from field to field in water droplets.
3. And yet rice plants possess an amazing assortment of genes that offer protection from a host of diseases, including bacterial blight.
4. With the advent of genetic engineering, we are now able to introduce isolated disease-resistance genes directly into rice plants, trimming years from the time required to develop a useful variety.
5. The story of the first disease-resistance gene cloned from rice begins in the developing world.
6. A year later Gurdev S. Khush and his co-workers at the International Rice Research Institute (IRRI) in the Philippines began work with *O. longistaminata*.
7. In 1990, just as they were reaping the intellectual rewards of this labor, I became a postdoctoral fellow at Cornell University.
8. To clone *Xa21*, I needed to identify the precise region of the rice genome that bears this gene, transfer this bit of DNA into bacteria where it could be easily copied, insert these copies into susceptible rice plants and then prove that the inserted DNA made these plants resistant to blight.
9. Finding a gene in a genome is a lot like the proverbial search in the haystack, and the genomes of most plants are particularly huge haystacks.
10. In 1990 I felt the time was right for cloning genes from rice, because pioneering work led by Steven D. Tanksley and Susan R. McCouch, also at Cornell, had just produced a key development: a map to guide my exploration of the vast rice genome.
11. Over a period of a few years, first at Cornell and later at the University of California at Davis, my colleagues and I used this map to track down *Xa21*.

.../...

12. By sheer luck, the first chromosomal landmark that my group and I identified as lying very close to *Xa21* turned out to be incredibly useful.
13. My group and I spent the next year cloning candidate *Xa21* genes and preparing to insert them into other rice plants.
14. This problem of transferring genes into plant cells is the second great hurdle in engineering disease resistance.
15. Researchers did not use this technique in rice until 1991; when we were ready to test our *Xa21* clone, the International Laboratory for Tropical Agriculture Biotechnology (ILTAB) was one of the facilities doing so routinely.
16. Researchers at ILTAB used the gun to transform our cloned DNA into rice cells of the variety Taipei 309.
17. We exposed each of our transonic plants to *Xoo* by trimming their leaves with scissors dipped in a bacterial suspension.
18. We had succeeded in cloning *Xa21*.
19. Our current goal is to insert *Xa21* into varieties that, unlike Taipei 309, are agriculturally important.
20. With these exciting results in hand, I have sent *Xa21* to scores of scientists throughout Europe, Africa, Asia and the U.S., with the objective of introducing bacterial blight resistance into locally important rice varieties.
21. Once we have generated these new varieties, we need to field-test the plants for yield, taste and hardiness to establish that the useful traits of the original varieties remain unchanged.
22. Compared with conventional breeding, genetic engineering is quick and flexible: we can shuttle individual cloned genes between plants in a matter of months.
23. Thus, scientists should be able to harness cloned resistance genes to control disease in many crops beside rice.
24. Genetic engineering may also help us cope with the problems any disease-resistant plant faces once it is in the field.
25. We also hope to incorporate resistance to more than one pathogen in a single transgenic line.
26. Transgenic disease-resistant plants hold great commercial promise.
27. Industrial nations will probably benefit most from the currently available transgenic products.
28. With the commercial promise of transgenic disease-resistant crops comes a social responsibility.
29. The potential of genetic engineering in rice and other grains will not be exhausted with disease resistance.

(Ronald, P.C. 1997. Making rice disease-resistant. *Scientific American*. November: 68-73.)

TEXT 9B-2

2. Read the paragraphs below and complete the task on the answer sheets provided. (plenary: 5 min.)

Paragraph 1

Apoptosis is a cell suicide mechanism observed to occur in culture or *in vivo* under normal physiological conditions (Cotter and Al-Rubeai 1995). The process is characterized by a programmed pattern of cellular events. Endogenous endonucleases are activated to cleave the DNA into fragments of about 180 bp. The cell membrane assumes a characteristic ruffled appearance with many blebs. This is followed by cell shrinkage, nuclear condensation, and fragmentation of the cell into discrete membrane-enclosed apoptotic bodies (*Figure 3.2*). *In vivo*, the apoptotic bodies generated by cell breakdown are phagocytosed by adjacent cells.

(Butler, M. 1996. *Animal cell culture and technology: the basics*. Oxford: IRL Press: 20.)

Paragraph 2

For most plants, the scarcity of nitrogenous compounds in the soil is one of the main growth-limiting factors. Although nitrogen is abundant in the air (78% of the atmosphere is N_2), plants have no enzyme systems that can use that nitrogen. Only some prokaryotes can use N_2 by incorporating it into their bodies as amino acids and nucleotides; when they die and decompose, the nitrogenous compounds are available to plants. The chemical process of converting atmospheric nitrogen into usable compounds is nitrogen fixation.

(Mauseth, J.D. 1995. *Botany: an introduction to plant biology*. 2nd edn. Philadelphia: Sanders College Publishing: 191.)

Paragraph 3

In the EU, farmers work within the framework of the widely criticized Common Agriculture Policy (CAP) which gives preference to agricultural commodities produced in the EU, provides price supports to farm products and attempts to produce an equal market across the members states (see Box 5.1). In the USA, where agriculture is a major export earner and there is a substantial farm lobby, the Government intervenes by offering direct support to farmers' incomes, through a mixture of price supports via loan schemes which effectively act as a floor price, public stock management, production restraints through area reductions and land conservation programmes.

(Tansey, G. and T. Worsley. 1995. *The food guide system*. London: Earthscan Publications: 95-96.)

Paragraph 4

Coriander (*Coriandrum sativum* L.) is an annual herb belonging to the carrot family, Umbelliferae. It is a native of the Mediterranean region. It is one of the earliest species used by mankind and is cultivated extensively for seed and as a herbal crop in India and to a lesser extent in the former Soviet States, central Europe, middle East, South America and South and Western Australian. The young plants have a unique flavour and are used in chutneys, sauces, curries and soup. The dried fruits are important ingredients of curry powder. Coriander is used medicinally for a number of purposes, particularly as a carminative. The fruits and the oil are used as a flavouring agent to cover the taste or correct the nauseating or griping qualities of other medicine.

(Reddy, K. and M.P. Rolston. 1999. Coriander (*Coriandrum sativum* L.) seed production: nitrogren, row spacing, sowing rate and time of sowing. *Journal of Applied Seed Production.* 17: 49.)

Paragraph 5

Just behind the root cap and root apical meristem is a zone of elongation only a few millimetres long within which the cells undergo division and expansion (see Fig. 7.7). Behind it is the root hair zone, a region in which many of the epidermal cells extend out as narrow trichomes. Root hairs can form only in a part of the root that is not elongation or they would be shorn off.

(Mauseth, J.D. 1995. *Botany: an introduction to plant biology.* 2nd edn. Philadelphia: Sanders College Publishing: 191.)

TEXT 9B-3

3. Read the paragraphs taken from the introduction of a journal article and complete the tasks on the answer sheets provided. (pair work: 10 min.)

Paragraph A

Those investigating the biology of mycorrhiza are increasingly aware of the pivotal role played by the external mycelium of mycorrhizal roots in nutrient capture by plants (Smith and Read, 1997). It is this distal part of the carbon pathway which is likely to be critical in determining the success of nutrient scavenging processes. While there have been reports of changes in the population structure (Godbold and Bernston, 1997; Rey and Jarvis, 1997) and of increased fungal occurrence under elevated CO_2 (Tingey et al., 1997) only one study (Ineichen et al., 1995) has specifically shown increased production of mycorrhizal hyphae under these conditions. This study revealed a doubling of the biomass of external mycelium of *Pisolithus tinctorius* growing from colonised roots of *Pinus sylvestris* grown at 600 $\mu l\ l^{-1}$. In addition, a triplication of the number of mycorrhizas themselves was observed in this treatment. The experiments of Ineichen et al. (1995) were carried out using an unnatural substrate, cardboard, to support mycorrhiza development.

Paragraph B

In the present study we set out to determine the effects of elevated CO_2 upon biomass gain and nutrient relations of *P. sylvestris* grown, using *Sphagnum* peat as substrate, in mycorrhizal (MIN.) association with two fungi *Suillus bovinus* and *Paxillus involutus*, and in the non-mycorrhizal (NMIN.) condition. We paid particular attention to the relationship between mycorrhizal colonisation, development of the external mycelium, and the response of the plants grown under ambient (C_{AMB}) and elevated (C_{ELEV}) CO_2 (700 $\mu l\ l^{-1}$). We hypothesised that growth under C_{ELEV} would lead to enhancement of below ground carbon allocation that would be detectable in the form of greater mycelial and mycorrhizal root development but that different fungal symbionts would respond differently.

Paragraph C

It is no longer in doubt that increases of atmospheric CO_2 concentration can exert profound influences upon the growth and carbon allocation of trees. Average increases of biomass of 64 tree species exposed to various elevated CO_2 regimes were reported by Ceulemans and Mousseau (1994) to be 63% for deciduous and 38% for coniferous species. However, the mechanisms involved in the facilitation of these responses are not understood. It is generally accepted that the additional carbon fixed by plants exposed to elevated CO_2 is allocated to roots (Bazzaz, 1990), the expectation being that this would promote the ability of the plant to capture the nutrients necessary to sustain the enhanced growth. In this case the ultimate destination of much of the assimilate allocated below ground is likely to be mycorrhizal roots and mycelium but these parts of the carbon pathway are relatively poorly understood. Among those who have considered the mycorrhizal component some have observed increases in mycorrhiza formation in response to elevated CO_2 (Norby et al., 1987; Tingey et al., 1995, 1996, 1997) while others have found any such effect to be short-lived (O'Neill et al., 1987b; Lewis et al., 1994). Occasionally even reductions of mycorrhiza formation have been reported (Walker et al., 1997).

(Rouhier, H. and D.J. Read. 1998. Plant and fungal responses to elevated atmospheric carbon dioxide in mycorrhizal seedlings of *Pinus sylvestris*. *Environmental and Experimental Botany*. 40: 237-238.)

TEXT 9B-4

4. Now read the introduction and discussion (or conclusion) of the journal article you brought with you to the lesson. If you did not bring one, please ask for one. Highlight the thesis statement and the topic sentences of the first 4 paragraphs, in case they have a topic sentence. (individual or pair work: 15 min.)

The locomotion of dairy cows in passageways with different light intensities

Introduction

Most recommendations for the welfare of dairy cows do not include advice on the provision of supplementary light for housed cows, although the *UK Codes of Recommendation for the Welfare of Cattle* suggests that consideration should be given to providing "light during hours of daylight, and lighting readily available to enable the animals to be inspected at any time" (Ministry of Agriculture, Fisheries and Food *et al* 1983). In extreme latitudes, dairy cows may be kept inside in the dark for two-thirds of the day during winter, and their welfare may suffer if a combination of high stocking densities and the absence of light impedes normal behaviour. Grazing dairy cows are reluctant to feed at night, only doing so if they are unable to obtain sufficient food during daylight hours (Phillips & Denne 1988). The conserved food offered to housed dairy cows is consumed much faster than fresh grass can be grazed by outdoor cows (Phillips & Leaver 1986), but aggression at the feeding trough during the day forces some subordinate cows to feed at night. Providing supplementary light at night encourages more cows to fed at this time (Phillips & Schofield 1989) and may increase the confidence that the cows have in moving around a crowded building. Hence, although individually tethered or stalled cattle show only a slight preference for performing certain behaviours in the light, principally feeding (Phillips & Arab 1998), loose-housed cattle are more affected by supplementary light, and alter their behaviour patterns to take account of the extended day (Phillips & Schofield 1989; Weiguo & Phillips 1991). Movement around the building is likely to be affected, especially to and from feed supplies, with dairy cows strongly avoiding dark passageways (Morris 1994).

Dairy cows have large eyes with a high concentration of rods (approximately five or six rods to one cone at the periphery [Rochon-Duvigneaud 1943]), and a tapetum (light reflecting layer), and are therefore well adapted to low light levels. They do not have a fovea for object discrimination at a point, as humans do, but possess a broad band of high retinal cell density that we assume gives them good vision on the horizon (Heffner & Heffner 1992). The response of dairy cows to different light intensities in passageways has not been studied before. The visual acuity of calves is reduced at light intensities of less than 2 lux (Eiermann 1978). There is also behavioural evidence of greater object recognition at 100-130 lux than at 2-20 lux, since Dannenmann *et al* (1985) found that penned calves were more socially active at high light intensities (100-130 lux), although one cannot eliminate photostimulation as an explanation for their observation. Brightness discrimination in calves is not as good as in humans (Phillips & Weiguo 1991).

Two experiments were conducted to examine the effects of lighting passageways to various intensities on the locomotion of dairy cows. Experiment 1 took place on return from milking, down a passageway which the dairy cows normally traversed rapidly to return to their accommodation for food; Experiment 2 took place in a cubicle building, with dairy cows walking down a passageway to obtain a small food reward. [...]

.../...

Animal welfare implications

When housed dairy cows walk in dark, their normal locomotory behaviour is disrupted. The research presented here, together with other published evidence (Phillips & Schofield 1989), suggests that they try to avoid being in dark passageways for longer than necessary. At the high stocking densities which prevail in modern dairy buildings, it may improve the welfare of these cows if farmers provide a low level of lighting in passageways at all times. The optimum intensity of this light may be between 32 and 119 lux, although the changes we observed in locomotory behaviour at intensities between 0.7 and 250 lux were small relative to the differences we observed in dairy cows' locomotion between unlit and lit conditions. Some preliminary evidence that the highest light intensity (250 lux) may have induced glare is presented.

(Phillips, C.J.C., I.D. Morris, C.A. Lomas and S.J. Lockwood. 2000. The locomotion of dairy cows in passageways with different light intensities. *Animal Welfare*. 9: 421, 422, 429, 430.)

Unit 9 – Activities B
Thesis statement and topic sentences
Answer sheets
(45 min.)

TEXT 9B-1

1.1 Sum up the content of the text in one or two sentences.

1.2 Would you read the text in more detail to use it in your talk?

TEXTS 9B-2

2. 1 Which paragraphs have a topic sentence? Tick (✓) the appropriate box or boxes. The first one is done for you.

Paragraph 1	Paragraph 2	Paragraph 3	Paragraph 4	Paragraph 5
✓				

2. 2 In the paragraph(s) that has/have a topic sentence, is it the first or the last sentence? Tick (✓) the appropriate box or boxes. The first one is done for you.

Paragraph	First sentence	Last sentence
1	✓	
2		
3		
4		
5		

TEXT 9B-3

3.1 Reorder the paragraphs in the box provided below.

Paragraph A	Paragraph B	Paragraph C

3.2 In which paragraph is the thesis statement?

Unit 9 – Activities C

Answer sheets

(20 min.)

TEXT 9C-1

1. Read the introduction of a research article and answer the two questions below.

Introduction

Turkey eggs are normally incubated at 37.5°C and increases of 1° C or more above the optimum have been shown to reduce hatching success significantly (Romanoff, 1935; French, 1994*a*; French, 1994*b*). In artificial incubators used by the turkey industry, air temperatures around the eggs in excess of 38.5° C have been recorded for varying lengths of time even though the machine operating temperature was close to optimum (French, 1997). It is of considerable commercial importance to know whether these temperatures observed in turkey incubators are likely to reduce hatching success and require correction.

Few studies have investigated the degree of tolerance of turkey embryos to overheating. Romanoff (1935) incubated turkey eggs at 37.5°C, 38.5°C, 39.5°C, 40.5°C and 41.5°C on d 21 to 28 of incubation and found that as temperature increased above 37.5°C there was an increasing reduction in hatch. At 41.5°C, no turkeys hatched. Incubating eggs at 38.5°C from d 0 to 25 (French 1994*a*) and d 15 to 25 (French 1994*b*) significantly decreased hatchability compared to 37.5°C controls.

Studies on chicken eggs have shown that the negative effect of high incubation temperature on hatchability tends to increase with increasing temperature and increasing exposure time (Wilson, 1991). The effects of high incubation temperature have also been shown to depend on the stage of chick embryo development, although there are differences between studies as to when, during the incubation period, embryos are most susceptible to high temperature.

Romanoff *et al.* (1938) found that 0 to 5 d chick embryos were more likely than older embryos to die when exposed to 41°C for 24 h. Exposing embryos 41°C for 3 h was found to increase embryo mortality and this increase was greater when applied to embryos at 9 and 10 d compared to 7 and 8 d of incubation (Morgan an Tucker, 1967). Moreng and Shaffner (1951) found that an incubation temperature of 43.5°C killed 4 d embryos after 10 min exposure, whereas embryos at 1 d or over 7 d of age were able to survive this temperature for up to 8 h exposure. However, the results from a study by Ande and Wilson (1981) did not support the observations of the previous 3 studies. They exposed 3, 7, 11, 16 and 19 d embryos to 43.3°C for between 1 and 12 h and measured the effect on hatchability and found that 3 d embryos were the most resistant to heat stress, whereas 7 and 19 d embryos were the least resistant.

.../...

(cont.)

Direct temperature measurements within incubators can be used to identify high temperature problems, but other indicators such as embryo pathology and length of incubation period can also be useful. High incubation temperatures have been associated with increased turkey embryo mortality between 15 and 20 d and 24 to 28 d of incubation and an increase in the incidence of embryos with excess albumen, ruptured yolk sacs, oedematous heads, eye cataracts and swollen down plumules (French 1994*a*).

The intention of the present study was to study the effects of high incubation temperatures applied for different lengths of time and at different stages of the incubation period on the hatchability of turkey eggs and the incidence of embryo gross pathology. The high temperatures chosen in this study (38.0 and 38.5°C) are lower than have been observed within incubators used by the turkey industry (French, 1997). Some of the results given here were also presented in the proceedings of the 10th European Poultry Conference (French, 1998).

1.1 Choose the most appropriate title for the article. Tick (✓) one box.

Effect of short periods of high incubation temperature: critical period of high incubation of turkey eggs	
Effect of short periods of high incubation temperature: influence of the age of the turkey eggs and incidence on embryo pathology	
Effect of short periods of high incubation temperature on hatchability and incidence of embryo pathology of turkey eggs	
Effect of short periods of high incubation temperature on the hatchability of turkey eggs	
Effect of short periods of high incubation temperature on hatchability and influence of the age of turkey eggs	

1.2 Underline the sentence or sentences which helped you in your choice.

TEXTS 9C-2

2. Read the following paragraphs and answer the two questions below.

Paragraph 1

Crop rotation has been practised for centuries – different crops are grown in succession on the same land, often including a legume crop to provide some N [nitrogen] to the rotation. Examples of rotations are maize-soybean, common in the USA; wheat-soybean, practised in Argentina; wheat-clover pasture in Australia, and cereals-oilseed rape in Europe. Crop rotation commonly increases soil productivity. It is primarily a sanitary measure to improve weed control and prevent carry-over of infections from one crop to the succeeding ones, but also improves soil structure, water-holding capacity and nutrient availability (Bullock, 1992; Karlen *et al.*, 1994). However, crops differ in profitability, and elaborate crop rotations increase the need for investments in machinery and make farm management more complex. With technological improvements, farming has tended towards monocropping systems, but crop rotation is now receiving renewed attention.

(Lægreid, M., O.C. Bøckman and E.O. Kaarstad. 1999. *Agriculture, fertilizers and the environment*. Wallingford: CABI Publishing/ CAB International: 56.)

Paragraph 2

Soils vary in their ability to retain nutrients and water. The content of organic matter, clay and iron, and aluminium oxides are all important factors controlling nutrient and/or water retention. Generally, clay soils are best at retaining nutrients and water, while sandy soils and some highly weathered tropical soils have the lowest capacity. Increasing the organic matter content of the latter improves these qualities.

(Lægreid, M., O.C. Bøckman and E.O. Kaarstad. 1999. *Agriculture, fertilizers and the environment*. Wallingford: CABI Publishing/ CAB International: 93.)

Paragraph 3

The movements of the atmosphere are sufficient to keep a large quantity of solid and liquid particles suspended in it. Although visible dust sometimes clouds the sky, these relatively large particles are too heavy to stay in the air for very long. Still, many particles are microscopic and remain suspended for considerable periods of time. They may originate from many sources, both natural and human made, and include sea salts from breaking waves, fine soil blown into the air, smoke and soot from fires, pollen and microorganisms lifted by the wind, ash and dust from volcanic eruptions, and more. Collectively, these tiny solid and liquid particles are called **aerosols**.

(Lutgens, F.K. and E.J. Tarbuck. 1998. *The atmosphere*. 7th edn. London: Prentice-Hall International, Inc.: 7.)

Paragraph 4

With the coming of the Renaissance, there was a revival of scientific spirit, and interest in botany increased. The invention of printing with movable type in about 1440 allowed botanical books to be produced that were available to a wider audience that the former hand-copied manuscripts. Botanical books were produced with descriptions and illustrations made from woodblocks or metal plate engravings. They were intended to be used for identifying medicinal plants.

(Jones, S.B. and A.E. Luchsinger. 1987. *Plant systematics.* 2nd edn. New York: McGraw-Hill: 13-14.)

2.1 What is each paragraph about? Answer in the box provided. The first one is done for you.

Paragraphs	The paragraph is about....
1	**Crop rotation**
2	
3	
4	

2.2 Underline the sentence in each paragraph that gives the main idea of the paragraph. The first one is done for you.

References: Texts used in the course

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APPENDIX 9

End of unit feedback questionnaire

Feedback questionnaire
End of unit

Please tick (⊛) the appropriate box (1 to 5).

SESSION	Yes	No	Unsure
1. The topic of the unit was new to me.			
2. I think I have learnt something useful in this session.			
3. Being aware of the topic of the unit will be useful in reading academic English.			
4. I will use the content of the unit for other purposes than reading academic English*.			
5. I would benefit from learning more on this topic**.			
* If you answer yes to question 4 please specify:			
** If you answer yes to question 5 please specify:			

6. What I have learnt from this lesson that I will use next time I read....

7. Do you have any comments or suggestions which could help to improve this session?

Answer question 6 for yourself.
Please detach this part and take it with you.

6. What I have learnt from this lesson that I will use next time I read....

APPENDIX 10

While-reading questionnaire

Unit 1
Journal articles and textbooks
Follow-up: reading

Choose an academic text which interests you and do not forget to bring it to next lesson.

Read the text you chose before lesson 2 and summarise it in Portuguese.

After having read and summarised the text complete the table below by ticking (✓) the appropriate box:

While I was reading I paid attention to….	YES	NO	UNSURE
the structure and organisation of the text.			

Please do not forget

To hand in a copy of the text and the summary you have written at the beginning of lesson 2.

To answer the mini questionnaire and hand it in at the beginning of lesson 2.

Unit 2
Reviews, previews and action markers
Follow-up: reading

Choose an academic text which interests you and do not forget to bring it to next lesson.

Read the text you chose before lesson 3 and summarise it in Portuguese.

After having read and summarised the text complete the table below by ticking (✓) the appropriate boxes:

While I was reading I paid attention to....	YES	NO	UNSURE
the structure and organisation of the text.			
reviews, previews and action markers.			

Please do not forget

To hand in a copy of the text and the summary you have written at the beginning of lesson 3.

To answer the mini questionnaire and hand it in at the beginning of lesson 3.

Unit 3
Connectors
Follow-up: reading

Choose an academic text which interests you and do not forget to bring it to next lesson.

Read the text you chose before lesson 4 and summarise it in Portuguese.

After having read and summarised the text complete the table below by ticking (✓) the appropriate boxes:

While I was reading I paid attention to....	YES	NO	UNSURE
the structure and organisation of the text.			
reviews, previews and action markers.			
the use of connectors.			

Please do not forget

To hand in a copy of the text and the summary you have written at the beginning of lesson 4.

To answer the mini questionnaire and hand it in at the beginning of lesson 4.

Unit 4
Discourse structuring words
Follow-up: reading

Choose an academic text which interests you and do not forget to bring it to next lesson.

Read the text you chose before lesson 5 and summarise it in Portuguese.

After having read and summarised the text complete the table below by ticking (✓) the appropriate boxes:

While I was reading I paid attention to....	YES	NO	UNSURE
the structure and organisation of the text.			
reviews, previews and action markers.			
the use of connectors.			
discourse structuring words.			

Please do not forget

To hand in a copy of the text and the summary you have written at the beginning of lesson 5.

To answer the mini questionnaire and hand it in at the beginning of lesson 5.

Unit 5
Decoding noun chains
Follow-up: reading

Choose an academic text which interests you and do not forget to bring it to next lesson.

Read the text you chose before lesson 6 and summarise it in Portuguese.

After having read and summarised the text complete the table below by ticking (✓) the appropriate boxes:

While I was reading I paid attention to....	YES	NO	UNSURE
the structure and organisation of the text.			
reviews, previews and action markers.			
the use of connectors.			
discourse structuring words.			
noun chains.			

Please do not forget

To hand in a copy of the text and the summary you have written at the beginning of lesson 6.

To answer the mini questionnaire and hand it in at the beginning of lesson 6.

Unit 6
Nominal style
Follow-up: reading

Choose an academic text which interests you and do not forget to bring it to next lesson.

Read the text you chose before lesson 7 and summarise it in Portuguese.

After having read and summarised the text complete the table below by ticking (✓) the appropriate boxes:

While I was reading I paid attention to....	YES	NO	UNSURE
the structure and organisation of the text.			
reviews, previews and action markers.			
the use of connectors.			
discourse structuring words.			
noun chains.			
the use of nominalisations.			

Please do not forget

To hand in a copy of the text and the summary you have written at the beginning of lesson 7.

To answer the mini questionnaire and hand it in at the beginning of lesson 7.

Unit 7
Hedging
Follow-up: reading

Choose an academic text which interests you and do not forget to bring it to next lesson.

Read the text you chose before lesson 8 and summarise it in Portuguese.

After having read and summarised the text complete the table below by ticking (✓) the appropriate boxes:

While I was reading I paid attention to....	YES	NO	UNSURE
the structure and organisation of the text.			
reviews, previews and action markers.			
the use of connectors.			
discourse structuring words.			
noun chains.			
the use of nominalisations.			
hedging.			

Please do not forget

To hand in a copy of the text and the summary you have written at the beginning of lesson 8.

To answer the mini questionnaire and hand it in at the beginning of lesson 8.

Unit 8
Reporting verbs
Follow-up: reading

Choose an academic text which interests you and do not forget to bring it to next lesson.

Read the text you chose before lesson 9 and summarise it in Portuguese.

After having read and summarised the text complete the table below by ticking (✓) the appropriate boxes:

While I was reading I paid attention to....	YES	NO	UNSURE
the structure and organisation of the text.			
reviews, previews and action markers.			
the use of connectors.			
discourse structuring words.			
noun chains.			
the use of nominalisations.			
hedging.			
reporting verbs.			

Please do not forget

To hand in a copy of the text and the summary you have written at the beginning of lesson 9.

To answer the mini questionnaire and hand it in at the beginning of lesson 9.

Unit 9
Topic sentences
Follow-up: reading

Choose an academic text which interests you.

Read the text you chose before the post-tests and summarise it in Portuguese.

After having read and summarised the text complete the table below by ticking (✓) the appropriate boxes:

While I was reading I paid attention to....	YES	NO	UNSURE
the structure and organisation of the text.			
reviews, previews and action markers.			
the use of connectors.			
discourse structuring words.			
noun chains.			
the use of nominalisations.			
hedging.			
reporting verbs.			
topic sentences.			

Please do not forget

To hand in a copy of the text and the summary you have written at the beginning of the post-tests.

To answer the mini questionnaire and hand it in at the beginning of the post-tests.

APPENDIX 11

Pre-course questionnaire

College of Agriculture of the Polytechnic Institute of Castelo Branco, Portugal and University of Edinburgh, United Kingdom

November 2000

To colleagues:

This is a questionnaire about reading. I would like to find out what you think about academic reading: please try to write what is true for you. If you cannot answer a question, leave it and go on to the next.

The information you give me will be studied at the University of Edinburgh in Britain. It will help me to understand the reading context at College of Agriculture of the Polytechnic Institute of Castelo Branco (ESACB). Each person will be assigned a number to ensure anonymity. This number will be retained by you throughout the course. The researcher will not know which number corresponds to which person. On each questionnaire and exercise you complete you will be asked to write your number. Therefore nothing you write will be revealed to anyone else, or used to assess you, and your name will not be included in the thesis.

Thank you for your time and help.

Now please begin.

1. I think that in order to succeed in my academic life ..... is....
Tick (✓) **one box for in each item**.

		very important	important	not very important	unsure
1.1	Listening to Portuguese	☐	☐	☐	☐
1.2	Reading in Portuguese	☐	☐	☐	☐
1.3	Speaking in Portuguese	☐	☐	☐	☐
1.4	Writing in Portuguese	☐	☐	☐	☐

2. I think that in order to progress in my academic career ..... is....
Tick (✓) **one box for in each item**.

		very important	important	not very important	unsure
2.1	Listening to English	☐	☐	☐	☐
2.2	Reading in English	☐	☐	☐	☐
2.3	Speaking in English	☐	☐	☐	☐
2.4	Writing in English	☐	☐	☐	☐

3. How often do you usually read academic texts for your work and teaching in Portuguese? Tick (✓) **one box.**

3.1 Everyday ☐

3.2 Once a week ☐

3.3 Several times a week ☐

3.4 A few times a month ☐

3.5 Occasionally ☐

3.6 Never ☐

3.7 Other ____________________________________

4. How often do you usually read academic texts for work and teaching in English? Tick (✓) **one box**.

4.1 Everyday ☐

4.2 Once a week ☐

4.3 Several times a week ☐

4.4 A few times a month ☐

4.5 Occasionally ☐

4.6 Never ☐

4.7 Other ______________________________

5. How often do you read non-academic texts in English? Tick (✓) **one box**.

5.1 Everyday ☐

5.2 Once a week ☐

5.3 Several times a week ☐

5.4 A few times a month ☐

5.5 Occasionally ☐

5.6 Never ☐

5.7 Other ______________________________

6. What sort of reading material do you consider helpful in your academic reading in Portuguese? Tick (✓) **one or more** boxes.

6.1 Books in your field ☐

6.2 Encyclopaedias ☐

6.3 Internet ☐

6.4 Journal articles ☐

6.5 Proceedings ☐

6.6 Textbooks ☐

6.7 Technical reports ☐

6.8 Other (specify) ________________

7. What sort of reading material do you consider helpful in your academic reading in English? Tick (✓) **one or more** boxes.

7.1 Books in your field ☐

7.2 Encyclopaedias ☐

7.3 Internet ☐

7.4 Journal articles ☐

7.5 Proceedings ☐

7.6 Textbooks ☐

7.7 Technical reports ☐

7.8 Other (specify) ____________________

8. How would you estimate the percentage (%) of academic texts you usually read in:

8.1 English ____________________ %
8.2 Portuguese ____________________ %
8.3 Other (specify) ____________________ %
8.4 I cannot make any estimation ____________________

9. How would you rate the availability of relevant academic material in your research area and courses you teach? Tick (✓) **one box** for **each item**.

	Excellent	**Good**	**Sufficient**	**Poor**	**None**
9.1 Portuguese	☐	☐	☐	☐	☐
9.2 English	☐	☐	☐	☐	☐
9.3*____________	☐	☐	☐	☐	☐
9.4*____________	☐	☐	☐	☐	☐
9.5*____________	☐	☐	☐	☐	☐

* Other language (specify)

10. In which languages are the references on your reading lists? Tick (✓) **one or more** boxes.

10.1 Portuguese ☐

10.2 English ☐

10.3 Other ☐ (specify) ____________________

11. What determines which texts you read for your academic work? Tick (✓) **one or more** boxes for each item.

I read texts which…	**Portuguese**	**English**	*______	*______
11.1 are on the teaching list of the course(s) I teach	☐	☐	☐	☐
11.2 look interesting	☐	☐	☐	☐
11.3 are not too difficult	☐	☐	☐	☐
11.4 references in papers I read	☐	☐	☐	☐
11.5 were recommended by a colleague	☐	☐	☐	☐
11.6 are easily available	☐	☐	☐	☐
11. 7 Other (specify) ______________________________	☐	☐	☐	☐

* Other language (specify)

12. Tick (✓) **two** boxes for **each item** (one for **English** and one for **Portuguese**.)

Some of the academic texts I read…	**Portuguese**		**English**	
	yes	**no**	**yes**	**no**
12.1 are borrowed from the college library	☐	☐	☐	☐
12.2 are borrowed from other libraries	☐	☐	☐	☐
12.3 come from interlibrary loans	☐	☐	☐	☐
12.4 are lent by colleagues	☐	☐	☐	☐
12.5 belong to me	☐	☐	☐	☐
12. 6 are in the Internet	☐	☐	☐	☐
12. 7 Other (specify) ______________________________	☐	☐	☐	☐

13. How often do you borrow books from the college library? Tick (✓) **<u>one box for English</u>** and **<u>one box for Portuguese</u>**.

	Portuguese	English
13.1 Everyday	☐	☐
13.2 Once a week	☐	☐
13.3 Several times a week	☐	☐
13.4 A few times a month	☐	☐
13.5 Occasionally	☐	☐
13.6 Never	☐	☐
13.7 Other (specify) ____________________	☐	☐

14. How often do you usually use the Internet? Tick (✓) **<u>one</u>** box.

14.1 Everyday ☐

14.2 Once a week ☐

14.3 Several times a week ☐

14.4 A few times a month ☐

14.5 Occasionally ☐

14.6 Never ☐

14.7 Other (specify) ____

15. In which languages do you read on the Internet?
Tick (✓) **<u>one or more</u>** boxes.
If you do not read in one of the languages leave a blank square.

15.1 Portuguese ☐

15.2 English ☐

15.3 Other ☐ (specify) ____________________

16. What do you use the Internet for?

17. How long do you think it takes you to read a medium size article (i.e. 6 pages) in English? Tick (✓) **one** box.

17.1 Up to 30 minutes	☐
17.2 Between 30 minutes and one hour	☐
17.3 More than one hour	☐
17.4 I do not know	☐

18. If you had to compare your reading speed in Portuguese and English how would you rate it? Tick (✓) **one** box.

I read...

18.1 as fast in Portuguese as in English.	☐
18.2 faster in Portuguese than in English.	☐
18.3 faster in English than in Portuguese.	☐
18.4 Other (specify) ____________________	☐

19. Tick (✓) **one box** for **each item**.

When I read an academic text in Portuguese, I aim to...	always	often	sometimes	seldom	never
19.1 understand the text in detail.	☐	☐	☐	☐	☐
19.2 understand the main points.	☐	☐	☐	☐	☐
19.3 find a particular piece of information.	☐	☐	☐	☐	☐
19.4 to check a particular piece of information.	☐	☐	☐	☐	☐
19.5 Other (specify) ____________________	☐	☐	☐	☐	☐

20. Tick (✓) **one box** for **each item**.

When I read an academic text in English, I aim to…	always	often	sometimes	seldom	never
20.1 understand the text in detail.	☐	☐	☐	☐	☐
20.2 understand the main points.	☐	☐	☐	☐	☐
20.3 find a particular piece of information.	☐	☐	☐	☐	☐
20.4 to check a particular piece of information.	☐	☐	☐	☐	☐
20.5 Other (specify) ______________________	☐	☐	☐	☐	☐

21. While you read an academic text for your work what do you do to help you understand the text? Tick (✓) **one or more** boxes.

21.1 I use colour marker pens to highlight the text or underline the text ☐

21.2 I write notes on the margins of the text ☐

21.3 I read the first and last paragraphs at first, and then, the first few lines in other paragraphs ☐

21.4 I use different colour marker pens to highlight opposing ideas in the text ☐

21.5 I try to find words such as "however", "but", "although" while reading ☐

21.6 I make notes ☐

21.7 I summarise the text ☐

21.8 I read the text more than once ☐

21.9 Other (specify) ☐

____

22. What do you usually do when you encounter an unfamiliar word when you read an academic text in English? Tick (✓) **one** box for each item.

	always	often	sometimes	never
22.1 I ignore it	☐	☐	☐	☐
22.2 I try to guess its meaning from context (i.e. the other words in the sentence)	☐	☐	☐	☐
22.3 I try to work out its meaning paying attention to the structure of the word, i.e. what parts form that word	☐	☐	☐	☐
22.4 I look it up in a monolingual dictionary	☐	☐	☐	☐
22.5 I look it up in a bilingual dictionary	☐	☐	☐	☐
22.6 I look it up in an internet dictionary	☐	☐	☐	☐
22. 7 I ask someone	☐	☐	☐	☐
22.8 Other (specify) ____________________	☐	☐	☐	☐

23. When do you use a dictionary? Tick (✓) **one or more** boxes.

23.1 Whenever I encounter an unfamiliar word	☐
23.2 When the word prevents me from understanding the meaning of a sentence	☐
23.3 When the word appears more than once in the text	☐
23.4 Only when I need to know the exact meaning of the word	☐
23.5 Never	☐

23.6 Other (specify) ____________________

24. What do you do while reading an academic text in English if you feel that you are not understanding the text? Tick (✓) **one or more** boxes.

24.1 I go back and read again ☐

24.2 I give up ☐

24.3 I carry on reading ☐

24.4 I read the text several times ☐

24.5 I ask someone ☐

24.6 I use a dictionary ☐

24.7 I make notes ☐

24.8 I summarise the texts ☐

24.9 Other (specify) ☐

____

25. What would prevent you from reading an academic text in English? Tick (✓) **one or more** boxes.

25.1 My level of English will not allow me to understand it thoroughly ☐

25.2 It is too time consuming ☐

25.3 There is an equivalent text in Portuguese ☐

25.4 The text has been translated into Portuguese ☐

25.5 Other (specify) ☐

____

26. Are there any other comments about reading you would like to make?

You have finished the questionnaire now. Thank you very much for your help.

Questionnaire before the course

College of Agriculture of the Polytechnic Institute of Castelo Branco, Portugal and University of Edinburgh, United Kingdom

November 2000

To the student:

This is a questionnaire about reading. I would like to find out what you think about academic reading: please try to write what is true for you. If you cannot answer a question, leave it and go on to the next.

The information you give me will be studied at the University of Edinburgh in Britain. It will help me to understand the reading context at College of Agriculture of the Polytechnic Institute of Castelo Branco (ESACB). Each person will be assigned a number to ensure anonymity. This number will be retained by you throughout the course. The researcher will not know which number corresponds to which person. On each questionnaire and exercise you complete you will be asked to write your number. Therefore nothing you write will be revealed to anyone else, or used to assess you, and your name will not be included in the thesis.

Thank you for your time and help.

Now please begin.

1. I think that in order to complete my studies at ESACB ..... is....
Tick (✓) **one box for in each item**.

		very important	important	not very important	unsure
1.1	Listening to Portuguese	☐	☐	☐	☐
1.2	Reading in Portuguese	☐	☐	☐	☐
1.3	Speaking in Portuguese	☐	☐	☐	☐
1.4	Writing in Portuguese	☐	☐	☐	☐

2. I think that in order to complete my studies at ESACB ..... is....
Tick (✓) **one box for in each item**.

		very important	important	not very important	unsure
2.1	Listening to English	☐	☐	☐	☐
2.2	Reading in English	☐	☐	☐	☐
2.3	Speaking in English	☐	☐	☐	☐
2.4	Writing in English	☐	☐	☐	☐

3. How often do you usually read academic texts for your studies in Portuguese? Tick (✓) **one box**.

3.1 Everyday ☐

3.2 Once a week ☐

3.3 Several times a week ☐

3.4 A few times a month ☐

3.5 Occasionally ☐

3.6 Never ☐

3.7 Other ______________________________

4. How often do you usually read academic texts for your studies in English? Tick (✓) **one box**.

4.1 Everyday ☐

4.2 Once a week ☐

4.3 Several times a week ☐

4.4 A few times a month ☐

4.5 Occasionally ☐

4.6 Never ☐

4.7 Other ____________________

5. How often do you read non-academic texts in English? Tick (✓) **one box**.

5.1 Everyday ☐

5.2 Once a week ☐

5.3 Several times a week ☐

5.4 A few times a month ☐

5.5 Occasionally ☐

5.6 Never ☐

5.7 Other ____________________

6. What sort of reading material do you consider helpful in your reading in Portuguese for your studies? Tick (✓) **one or more** boxes.

6.1 Books ☐

6.2 Encyclopaedias ☐

6.3 Internet ☐

6.4 Journal articles ☐

6.5 Lecturers' handouts ☐

6.6 Textbooks ☐

6.7 Other (specify) ____________

7. What sort of reading material do you consider helpful in your reading in English for your studies? Tick (✓) **one or more** boxes.

7.1 Books ☐

7.2 Encyclopaedias ☐

7.3 Internet ☐

7.4 Journal articles ☐

7.5 Lecturers' handouts ☐

7.6 Textbooks ☐

7.7 Other (specify) ____________________

8. How would you estimate the percentage (%) of academic texts you usually read in:

8.1 English ____________________ %
8.2 Portuguese ____________________ %
8.3 Other (specify) ____________________ %
8.4 I cannot make any estimation ____________________

9. How would you rate the availability of relevant academic material in your subjects? Tick (✓) **one** box for **each item**.

	Excellent	**Good**	**Sufficient**	**Poor**	**None**
9.1 Portuguese	☐	☐	☐	☐	☐
9.2 English	☐	☐	☐	☐	☐
9.3*_____________	☐	☐	☐	☐	☐
9.4*_____________	☐	☐	☐	☐	☐
9.5*_____________	☐	☐	☐	☐	☐

* Other language (specify)

10. In which languages are the materials you get from the lecturers? Tick (✓) **one or more** boxes.

10.1 Portuguese ☐

10.2 English ☐

10.3 Other ☐ (specify) ______________________

11. What determines which texts you read for your studies? Tick (✓) **one or more** boxes for **each item**.

I read texts which…	**Portuguese**	**English**	* ______	* ______
11.1 are on the teaching list	☐	☐	☐	☐
11.2 look interesting	☐	☐	☐	☐
11.3 are not too difficult	☐	☐	☐	☐
11.4 the lecturer suggests I should read	☐	☐	☐	☐
11.5 the lecturer insists I should read	☐	☐	☐	☐
11.6 are easily available	☐	☐	☐	☐
11. 7 Other (specify) ______	☐	☐	☐	☐

* Other language (specify)

12. Tick (✓) **two** boxes for **each item** (one for **English** and one for **Portuguese**.)

Some of the academic texts I read…	**Portuguese**		**English**	
	yes	**no**	**yes**	**no**
12.1 are borrowed from the college library	☐	☐	☐	☐
12.2 are borrowed from other libraries	☐	☐	☐	☐
12.3 come from interlibrary loans	☐	☐	☐	☐
12.4 are lent by colleagues	☐	☐	☐	☐
12.5 belong to me	☐	☐	☐	☐
12. 6 are in the Internet	☐	☐	☐	☐
12. 7 Other (specify) ______	☐	☐	☐	☐

13. How often do you borrow books from the college library? Tick (✓) **one box for English** and **one box for Portuguese**.

	Portuguese	**English**
13.1 Everyday	☐	☐
13.2 Once a week	☐	☐
13.3 Several times a week	☐	☐
13.4 A few times a month	☐	☐
13.5 Occasionally	☐	☐
13.6 Never	☐	☐
13.7 Other (specify) ____________________	☐	☐

14. How often do you usually use the Internet? Tick (✓) **one** box.

14.1 Everyday ☐
14.2 Once a week ☐
14.3 Several times a week ☐
14.4 A few times a month ☐
14.5 Occasionally ☐
14.6 Never ☐
14.7 Other (specify) ____

15. In which languages do you read on the Internet?
Tick (✓) **one or more** boxes.
If you do not read in one of the languages leave a blank square.

15.1 Portuguese ☐
15.2 English ☐
15.3 Other ☐ (specify) ____________________

16. What do you use the Internet for?

17. How long do you think it takes you to read a medium size article (i.e. 6 pages) in English? Tick (✓) **one** box.

17.1 Up to 30 minutes ☐

17.2 Between 30 minutes and one hour ☐

17.3 More than one hour ☐

17.4 I do not know ☐

18. If you had to compare your reading speed in Portuguese and English how would you rate it? Tick (✓) **one** box.

I read…

18.1 as fast in Portuguese as in English. ☐

18.2 faster in Portuguese than in English. ☐

18.3 faster in English than in Portuguese. ☐

18.4 Other (specify) ☐

____

19. Tick (✓) **one box** for **each item**.

When I read an academic text in Portuguese, I aim to…	always	often	sometimes	seldom	never
19.1 understand the text in detail.	☐	☐	☐	☐	☐
19.2 understand the main points.	☐	☐	☐	☐	☐
19.3 find a particular piece of information.	☐	☐	☐	☐	☐
19.4 to check a particular piece of information.	☐	☐	☐	☐	☐
19.5 Other (specify) ___________________________________	☐	☐	☐	☐	☐

20. Tick (✓) **one box** for **each item**.

When I read an academic text in English, I aim to…	always	often	sometimes	seldom	never
20.1 understand the text in detail.	☐	☐	☐	☐	☐
20.2 understand the main points.	☐	☐	☐	☐	☐
20.3 find a particular piece of information.	☐	☐	☐	☐	☐
20.4 to check a particular piece of information.	☐	☐	☐	☐	☐
20.5 Other (specify) ______________________	☐	☐	☐	☐	☐

21. While you read an academic text for your studies what do you do to help you understand the text? Tick (✓) **one or more** boxes.

21.1 I use colour marker pens to highlight the text or underline the text	☐
21.2 I write notes on the margins of the text	☐
21.3 I read the first and last paragraphs at first, and then, the first few lines in other paragraphs	☐
21.4 I use different colour marker pens to highlight opposing ideas in the text	☐
21.5 I try to find words such as "however", "but", "although" while reading	☐
21.6 I make notes	☐
21.7 I summarise the text	☐
21.8 I read the text more than once	☐
21.9 Other (specify) ______________________	☐

22. What do you usually do when you encounter an unfamiliar word when you read an academic text in English? Tick (✓) **one box** for **each item**.

	always	often	sometimes	never
22.1 I ignore it	☐	☐	☐	☐
22.2 I try to guess its meaning from context (i.e. the other words in the sentence)	☐	☐	☐	☐
22.3 I try to work out its meaning paying attention to the structure of the word, i.e. what parts form that word	☐	☐	☐	☐
22.4 I look it up in a monolingual dictionary	☐	☐	☐	☐
22.5 I look it up in a bilingual dictionary	☐	☐	☐	☐
22.6 I look it up in an internet dictionary	☐	☐	☐	☐
22. 7. I ask someone	☐	☐	☐	☐
22.8 Other (specify) ________________	☐	☐	☐	☐

23. When do you use a dictionary? Tick (✓) **one or more** boxes.

23.1 Whenever I encounter an unfamiliar word ☐

23.2 When the word prevents me from understanding the meaning of a sentence ☐

23.3 When the word appears more than once in the text ☐

23.4 Only when I need to know the exact meaning of the word ☐

23.5 Never ☐

23.6 Other (specify) ________________________________

24. What do you do while reading an academic text in English if you feel that you are not understanding the text? Tick (✓) **<u>one or more</u>** boxes.

24.1 I go back and read again ☐

24.2 I give up ☐

24.3 I carry on reading ☐

24.4 I read the text several times ☐

24.5 I ask someone ☐

24.6 I use a dictionary ☐

24.7 I make notes ☐

24.8 I summarise the texts ☐

24.9 Other (specify) ☐

____

25. What would prevent you from reading an academic text in English? Tick (✓) **<u>one or more</u>** boxes.

25.1 My level of English will not allow me to understand it thoroughly ☐

25.2 It is too time consuming ☐

25.3 There is an equivalent text in Portuguese ☐

25.4 The text has been translated into Portuguese ☐

25.5 Other (specify) ☐

____

26. Are there any other comments about reading you would like to make?

You have finished the questionnaire now. Thank you very much for your help.

APPENDIX 12

Post-course questionnaire

College of Agriculture of the Polytechnic Institute of Castelo Branco, Portugal and University of Edinburgh, United Kingdom

April 2001

To colleagues:

This is a follow up questionnaire to the course you have just finished about reading. I am interested to know how you feel about your improvement. Please try to write what is true for you. If you cannot answer a question, leave it and go on to the next.

The information you give me will be studied at the University of Edinburgh in Britain. It will help me to understand the reading context at EASCB. Nothing you write will be revealed to anyone else, or used to assess you, and your name will not be included in the thesis.

Thank you for your time and help.

Now please begin.

1. Complete the list below and rate your improvement by ticking (✓) **one box** for **each item**.

	did not improve	improved a bit	improved a lot	do not know
1. My reading speed in English	☐	☐	☐	☐
2. My vocabulary	☐	☐	☐	☐
3. My ability to use text structure or organisation	☐	☐	☐	☐
4. Other (specify)	☐	☐	☐	☐
5. Other (specify)	☐	☐	☐	☐
6. Other (specify)	☐	☐	☐	☐

2. How you rate your reading in English after the course. Please tick (✓) **one** box.

2.1 I expect to read fewer texts in English than before the course. ☐

2.2 I expect to read the same number of texts as before the course. ☐

2.3 I expect to read more texts in English than before the course. ☐

2.4 I do not know / I am not sure. ☐

If you chose answer 2.3 answer question 3 below.

3. I expect to read more texts in English than before the course because…
Please tick (✓) **one or more** box.

having English lessons and being exposed to the language helped me to be "tuned in" to English. ☐

I felt more encouraged to read in English. ☐

I felt more motivated to read in English. ☐

I feel more confident about my ability to read in English in the future ☐

Other________________________________ ☐

4. How do you rate the usefulness of the course topics for reading? Tick (✓) **one box** for **each item**.

Being aware of...	is not useful	is not very useful	is useful	is very useful	unsure
the structure and organisation of the text	☐	☐	☐	☐	☐
reviews, previews and action markers	☐	☐	☐	☐	☐
the use of connectors	☐	☐	☐	☐	☐
discourse structuring words	☐	☐	☐	☐	☐
noun chains	☐	☐	☐	☐	☐
the use of nominalisations	☐	☐	☐	☐	☐
hedging	☐	☐	☐	☐	☐
reporting verbs	☐	☐	☐	☐	☐
thesis statement and topic sentences	☐	☐	☐	☐	☐

5. What I found most useful in the course was....

6. What I found the least useful in the course was....

7. Is there anything else of relevance you would like to add?

You have finished the questionnaire now. Thank you very much for your help.

Questionnaire after the course

College of Agriculture of the Polytechnic Institute of Castelo Branco, Portugal and University of Edinburgh, United Kingdom

April 2001

To the student:

This is a follow up questionnaire to the course you have just finished about reading. I am interested to know how you feel about your improvement. Please try to write what is true for you. If you cannot answer a question, leave it and go on to the next.

The information you give me will be studied at the University of Edinburgh in Britain. It will help me to understand the reading context at EASCB. Nothing you write will be revealed to anyone else, or used to assess you, and your name will not be included in the thesis.

Thank you for your time and help.

Now please begin.

1. Complete the list below and rate your improvement by ticking (✓) **one box** for **each item**.

	did not improve	improved a bit	improved a lot	do not know
1. My reading speed in English	☐	☐	☐	☐
2. My vocabulary	☐	☐	☐	☐
3. My ability to use text structure or organisation	☐	☐	☐	☐
4. Other (specify)	☐	☐	☐	☐
5. Other (specify)	☐	☐	☐	☐
6. Other (specify)	☐	☐	☐	☐

2. How you rate your reading in English after the course. Please tick (✓) **one** box.

2.1 I expect to read fewer texts in English than before the course. ☐

2.2 I expect to read the same number of texts as before the course. ☐

2.3 I expect to read more texts in English than before the course. ☐

2.4 I do not know / I am not sure. ☐

If you chose answer 2.3 answer question 3 below.

3. I expect to read more texts in English than before the course because...
Please tick (✓) **one or more** box.

having English lessons and being exposed to the language helped me to be "tuned in" to English. ☐

I felt more encouraged to read in English. ☐

I felt more motivated to read in English. ☐

I feel more confident about my ability to read in English in the future ☐

Other________________________________ ☐

4. How do you rate the usefulness of the course topics for reading? Tick (✓) **one box** for **each item**.

Being aware of...	is not useful	is not very useful	is useful	is very useful	unsure
the structure and organisation of the text	☐	☐	☐	☐	☐
reviews, previews and action markers	☐	☐	☐	☐	☐
the use of connectors	☐	☐	☐	☐	☐
discourse structuring words	☐	☐	☐	☐	☐
noun chains	☐	☐	☐	☐	☐
the use of nominalisations	☐	☐	☐	☐	☐
hedging	☐	☐	☐	☐	☐
reporting verbs	☐	☐	☐	☐	☐
thesis statement and topic sentences	☐	☐	☐	☐	☐

5. What I found most useful in the course was….

6. What I found the least useful in the course was….

7. Is there anything else of relevance you would like to add?

You have finished the questionnaire now. Thank you very much for your help.

APPENDIX 13

Interview

Lectures' Interview

1 **Reading habits and preferences**

1.1 Do you enjoy reading?

1.2 What type of texts do you prefer to read?

1.3 Do you enjoy reading in Portuguese?

1.4 How about English?

1.5 Where do you usually read?

1.6 How often do you read? How would you score your reading?

2. **Reading skills and purposes**

2.1 Do you consider you need to read in English for your work?

2.2 How do you feel about reading English? How do you think you attitude affects your reading?

2.3 Why do you read texts in English? What is/are the purpose(s) of reading texts in English?

2.4 Do you consider texts written in English very different from texts written in Portuguese?

2.5 How well are you doing?

2.6 What do you do when you come across an unfamiliar word while reading in English or Portuguese?

2.7 How do you prefer to learn English vocabulary?

2.8 How do you organise your vocabulary learning?

2.9 Imagine you have to write a conference paper. You go to a library and find, for example, 30 articles on the topic. You do not have time to read them all. How do you decide which texts to read?

2.10 When a colleague recommends a book on your field what do you do? Do you read it all or do you select sections or chapters of the book? How do you select what to read in the book?

2.11 When you find an article in the library what do you read first? Why?

2.12 When a colleague sends you an article to read what do you read first? Why?

2.13 When a colleague sends you an article and you have not time to go through it in detail, what do you choose to read?

2.14 Do you always read texts in the same ways or do you use different strategies depending on the text? Can you give an example?

3. <u>**Reading problems**</u>

3.1 What do you perceive as your particular reading problems?

3.2 How do you feel about your reading speed in English?

3.3 How about your vocabulary?

3.4 Is text structure or organisation a problem for you?

3.5 7. Is there anything else of relevance you would like to add?

Students' Interview

1 **Reading habits and preferences**

.

1.1 Do you enjoy reading?

1.2 What type of texts do you prefer to read?

1.3 Do you enjoy reading in Portuguese?

1.4 How about English?

1.5 Where do you usually read?

1.6 How often do you read? How would you score your reading?

2. **Reading skills and purposes**

2.1 Do you consider you need to read in English for your studies?

2.2 How do you feel about reading English? How do you think you attitude affects your reading?

2.3 Why do you read texts in English? What is/are the purpose(s) of reading texts in English?

2.4 Do you consider texts written in English very different from texts written in Portuguese?

2.5 How well are you doing?

2.6 What do you do when you come across an unfamiliar word while reading in English or Portuguese?

2.7 How do you prefer to learn English vocabulary?

2.8 How do you organise your vocabulary learning?

2.9 Imagine you have to write an essay for one of your core disciplines. You go to the library and find, for example, 10 articles on the topic. You do not have time to read them all. How do you decide which texts to read?

2.10 When a lecturer recommends a book or textbook what do you do? Do you read it all or do you select sections or chapters of the book? How do you select what to read in the book?

2.11 When you find an article in the library what do you read first? Why?

2.12 When you are given an article to read what do you read first? Why?

2.13 When you are given an article to read and you have not time to go through it in detail, what do you choose to read?

2.14 Do you always read texts in the same ways or do you use different strategies depending on the text? Can you give an example?

3. **<u>Reading problems</u>**

3.1 What do you perceive as your particular reading problems?

3.2 How do you feel about your reading speed in English?

3.3 How about your vocabulary?

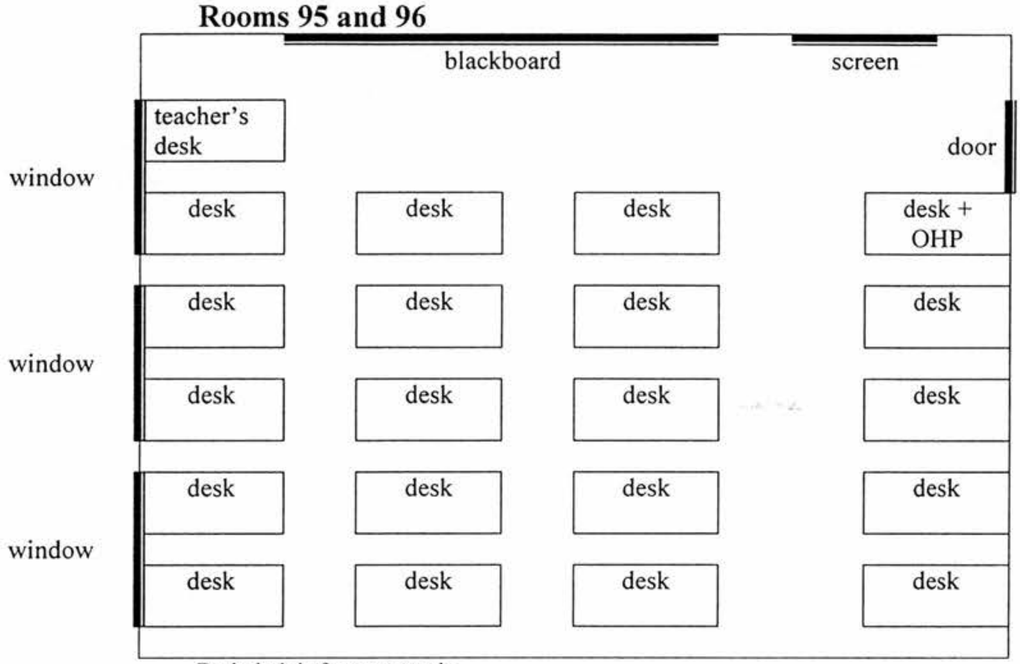
3.4 Is text structure or organisation a problem for you?

3.5 Is there anything else of relevance you would like to add?

APPENDIX 14

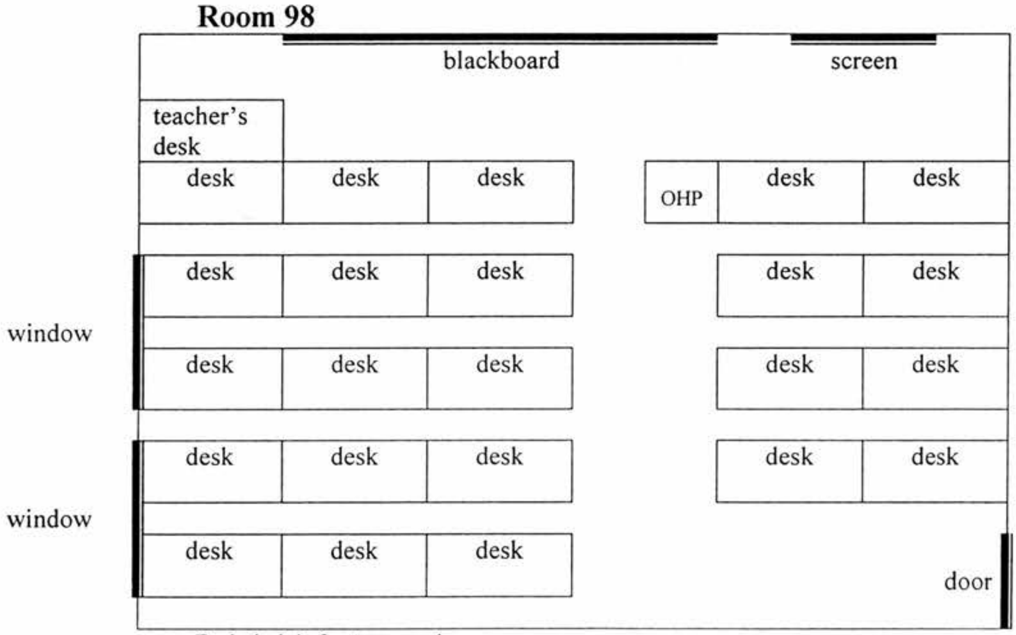
Seating arrangement in the classrooms and library study room

Rooms 95 and 96



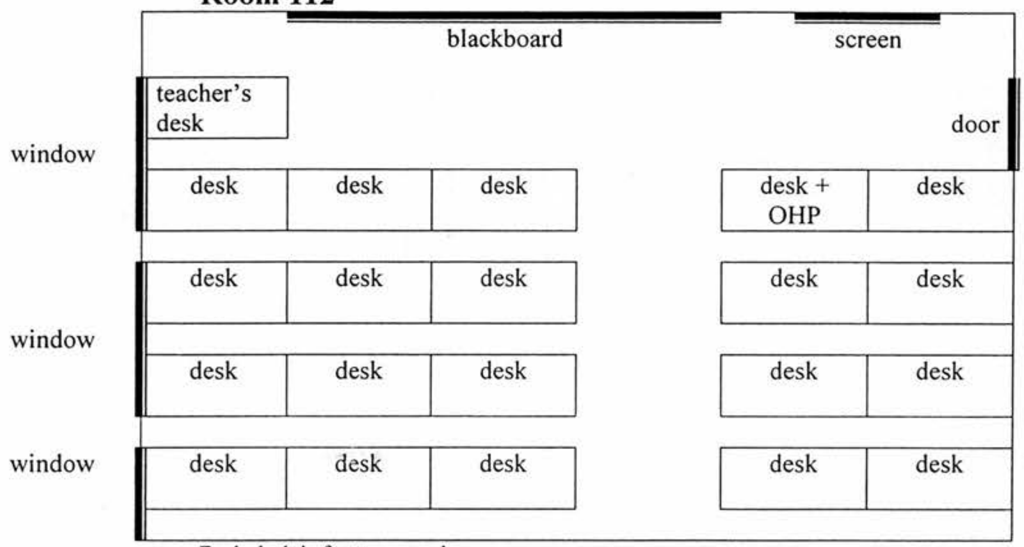
Each desk is for two people

Room 98



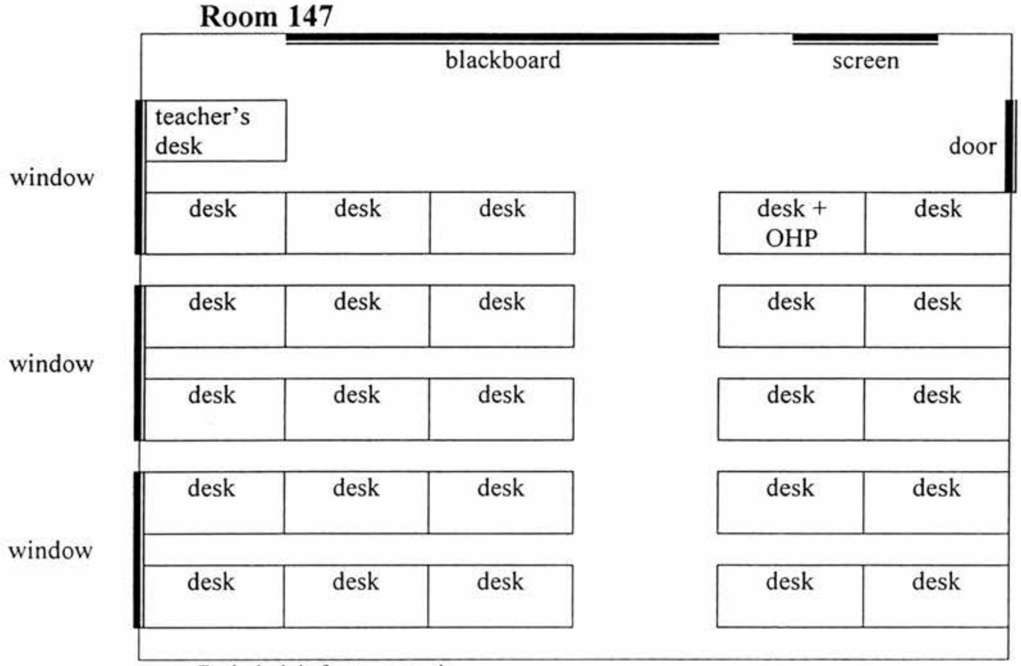
Each desk is for two people

Room 112

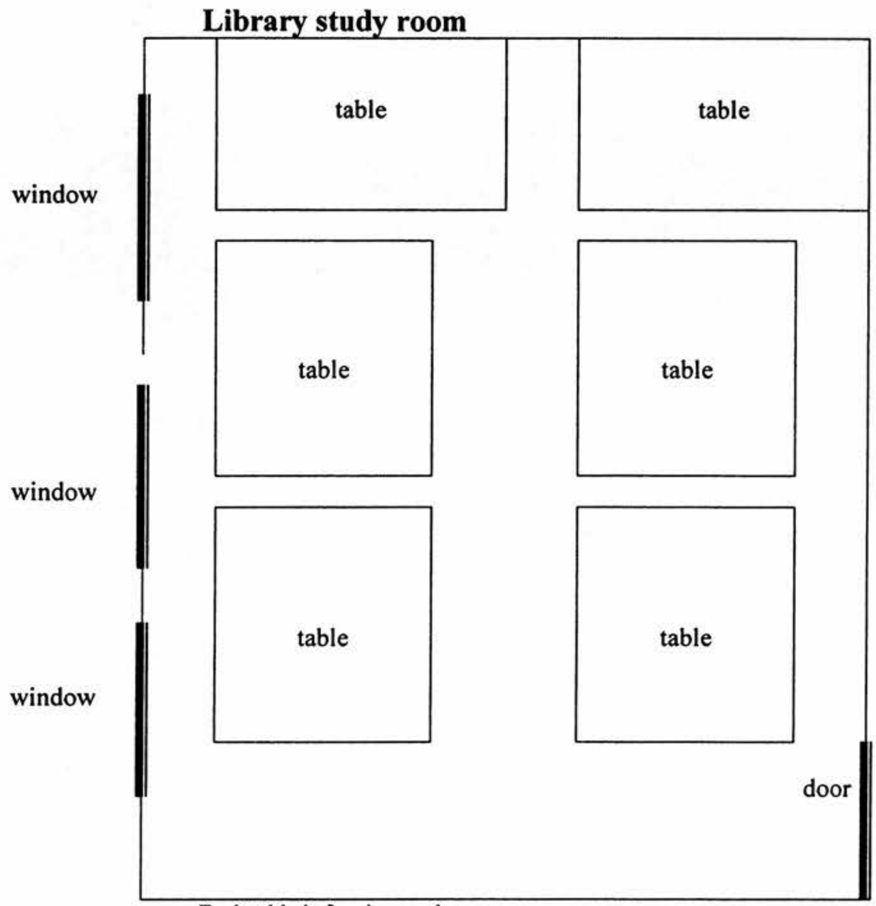


Each desk is for two people

Room 147



Each desk is for two people



Each table is for six people

APPENDIX 15

Transcription conventions

Speakers

T	teacher
S	unidentified student
SS	two or more students
L	unidentified lecturer
LL	two or more lecturers
S4	student number 4; used to identify the participant and also replaces name when T addresses student number 4 by name
L5	lecturer number 5; used to identify the participant and also replaces name when T addresses lecturer number 5 by name
S6?	probably student number 6

Other conventions

(( ))	extralinguistic information, including non-verbal behaviour
((unint))	unintelligible utterance
( )	probable utterance
:	extension of syllables or sounds
-	abrupt-cut off
yes/okay	overlapping or simultaneous speech
< >	written text that is spoken or read aloud
bold	emphasised word or syllable
!	emphasised utterance
...	short pause
new line	long pause
135	line number
lesson	English: text written in Times New Roman
lesson	Portuguese text translated into English: text written in Times New Roman italics

APPENDIX 16

Results: Pre-course questionnaire

1. I think that in order to succeed in my academic life ... is.../ to complete my studies at ESACB ... is...

1.1 Listening to Portuguese

		very important	important	not very important	unsure	Total
Lecturers	Count	13	2	0	0	15
	%	87.7%	13.3%	0%	0%	100.0%
Students	Count	17	3	0	0	20
	%	85.0%	15.0%	0%	0%	100.0%
Total	Count	30	5	0	0	35
	%	85.7%	14.3%	0%	0%	100.0%

1.2 Reading in Portuguese

		very important	important	not very important	unsure	Total
Lecturers	Count	14	1	0	0	15
	%	93.3%	6.7%	0%	0%	100.0%
Students	Count	15	5	0	0	20
	%	75.0%	25.0%	0%	0%	100.0%
Total	Count	29	6	0	0	35
	%	82.9%	17.1%	0%	0%	100.0%

1.3 Speaking in Portuguese

		very important	important	not very important	unsure	Total
Lecturers	Count	12	3	0	0	15
	%	80.0%	20.0%	0%	0%	100.0%
Students	Count	17	3	0	0	20
	%	85.0%	15.0%	0%	0%	100.0%
Total	Count	29	6	0	0	35
	%	82.9%	17.1%	0%	0%	100.0%

1.4 Writing in Portuguese

		very important	important	not very important	unsure	Total
Lecturers	Count	11	4	0	0	15
	%	73.3%	26.7%	0%	0%	100.0%
Students	Count	12	8	0	0	20
	%	60.0%	40.0%	0%	0%	100.0%
Total	Count	23	12	0	0	35
	%	65.7%	34.3%	0%	0%	100.0%

2. I think that in order to progress in my academic career … is…/ to complete my studies at ESACB … is…

		2.1 Listening to English				
		very important	important	not very important	unsure	Total
Lecturers	Count	6	8	1	0	15
	%	40.0%	53.3%	6.7%	0%	100.0%
Students	Count	5	10	5	0	20
	%	25.0%	50.0%	25.0%	0%	100.0%
Total	Count	11	18	6	0	35
	%	31.4%	51.4%	17.1%	0%	100.0%

		2.2 Reading in English				
		very important	important	not very important	unsure	Total
Lecturers	Count	6	8	1	0	15
	%	40.0%	53.3%	6.7%	0%	100.0%
Students	Count	5	11	4	0	20
	%	25.0%	55.0%	20%	0%	100.0%
Total	Count	11	19	5	0	35
	%	31.4%	54.3%	14.3%	0%	100.0%

		2.3 Speaking in English				
		very important	important	not very important	unsure	Total
Lecturers	Count	11	4	0	0	15
	%	73.3%	26.7%	0%	0%	100.0%
Students	Count	12	7	1	0	20
	%	60.0%	35.0%	5.0%	0%	100.0%
Total	Count	23	11	1	0	35
	%	65.7%	31.4%	2.9%	0%	100.0%

		2.4 Writing in English				
		very important	important	not very important	unsure	Total
Lecturers	Count	7	7	1	0	15
	%	46.7%	46.7%	6.7%	0%	100.0%
Students	Count	3	14	3	0	20
	%	15.0%	70.0%	15.0%	0%	100.0%
Total	Count	10	21	3	0	35
	%	26.6%	60.0%	15.0%	0%	100.0%

3. How often do you usually read academic texts for your work and teaching in Portuguese? / for your studies in Portuguese? Tick (✓) one box.

		3. Read academic texts in Portuguese							
		everyday	once a week	several times a week	a few times a month	occasionally	never	other	Total
Lecturers	Count	4	1	9	1	0	0	0	15
	%	26.7%	6.7%	60.0%	6.7%	0%	0%	0%	100.0%
Students	Count	2	1	8	4	3	0	2	20
	%	10.0%	5.0%	40.0%	20.0%	15.0%	0%	10.0%	100.0%
Total	Count	6	2	17	5	3	0	2	35
	%	17.1%	5.7%	48.6%	14.3%	8.6%	0%	5.7%	100.0%

4. How often do you usually read academic texts for work and teaching in English?/ for your studies in English? Tick (✓) one box.

		4. Read academic texts in English							
		everyday	once a week	several times a week	a few times a month	occasionally	never	other	Total
Lecturers	Count	1	1	8	4	1	0	0	15
	%	6.7%	6.7%	53.3%	26.7%	6.7%	0%	0%	100.0%
Students	Count	0	0	2	4	10	1	3	20
	%	0%	0%	10.0%	20.0%	50.0%	5.0%	15.0%	100.0%
Total	Count	1	1	10	8	11	1	3	35
	%	2.9%	2.9%	28.6%	22.9%	31.4%	2.9%	8.6%	100.0%

5. How often do you read non-academic texts in English. Tick (✓) one box.

		5. Read non-academic texts in English							
		everyday	once a week	several times a week	a few times a month	occasionally	never	other	Total
Lecturers	Count	0	1	4	2	4	3	1	15
	%	0%	6.7%	26.7%	3.3%	26.7%	20.0%	6.7%	100.0%
Students	Count	0	0	2	3	11	3	1	20
	%	0%	0%	10.0%	15.0%	55.0%	15.0%	5.0%	100.0%
Total	Count	0	1	6	5	15	6	2	35
	%	0%	2.9%	17.1%	14.3%	42.9%	17.1%	5.7%	100.0%

6. **What sort of reading material do you consider helpful in your academic reading in Portuguese? / in your reading in Portuguese for your studies? Tick (✓) one or more boxes.**

		6. Helpful reading material in Portuguese								
		proceedings[1]	journal articles	encyclopaedia	Internet	books	textbooks	lecturers' handouts[2]	technical reports[1]	other
LL	Count	6	14	1	9	15	14	-	8	2
	%	40.0%	93.3%	6.7%	60.0%	100.0%	93.3%		53.3%	13.3%
SS	Count	-	16	5	12	14	14	12	-	3
	%		80.0%	25.0%	60.0%	70.0%	70.0%	60.0%		15.0%
Total	Count	-	30	6	21	29	28	-	-	5
	%		85.7%	17.1%	60.0%	83.9%	80.0%			14.3%

LL= Lecturers; SS = Students
[1] only lecturers had this item
[2] only students had this item

7. **What sort of reading material do you consider helpful in your academic reading in English? / in your reading in English for your studies? Tick (✓) one or more boxes.**

		7. Helpful reading material in English								
		proceedings[1]	journal articles	encyclopaedia	Internet	books	textbooks	lecturers' handouts[2]	technical reports[1]	other
LL	Count	5	14	1	12	14	11	-	5	3
	%	33.3%	93.3%	6.7%	80.0%	93.3%	73.3%		33.3%	13.3%
SS	Count	-	17	2	14	12	10	4	-	3
	%		85.0%	10.0%	70.0%	60.0%	50.0%	20.0%		15.0%
Total	Count	-	31	3	26	26	21	-	-	6
	%		88.6%	8.6%	74.3%	74.3%	60.0%			17.1%

LL= Lecturers; SS = Students
[1] only lecturers had this item
[2] only students had this item

8. How would you estimate the percentage (%) of academic texts you usually read in (language)

8.1 Percentage (%) material read in Portuguese				
percentage		Lecturers	Students	Total
8%	Count	1	0	1
	%	6.7%	0%	2.9%
10%	Count	1	0	1
	%	6.7%	0%	2.9%
30%	Count	1	1	2
	%	6.7%	5.0%	5.7%
40%	Count	2	0	2
	%	13.3%	0%	5.7%
45%	Count	2	0	2
	%	13.3%	0%	5.7%
50%	Count	1	1	2
	%	6.7%	5.0%	5.7%
60%	Count	3	1	4
	%	20.0%	5.0%	11.4%
70%	Count	1	2	3
	%	6.7%	10.0%	8.6%
75%	Count	0	2	2
	%	0%	10.0%	5.7%
80%	Count	1	5	6
	%	6.7%	25.0%	1.7.1%
90%	Count	1	2	3
	%	6.7%	10.0%	8.6%
90-100%	Count	0	1	1
	%	0%	5.0%	2.9%
95%	Count	0	4	4
	%	0%	20.0%	11.4%
98%	Count	0	1	1
	%	0%	5.0%	2.9%

8.2 Percentage (%) material read in English				
percentage		Lecturers	Students	Total
1%	Count	0	1	1
	%	0%	5.0%	2.9%
2%	Count	0	2	2
	%	0%	10.0%	5.7%
5%	Count	0	6	6
	%	0%	30.0%	17.1%
10%	Count	3	6	9
	%	20.0%	30.0%	25.7%
15%	Count	2	0	2
	%	13.3%	0%	5.7%
20%	Count	3	2	5
	%	20.0%	10.0%	14.3%
25%	Count	0	1	1
	%	0%	5.0%	2.9%
30%	Count	1	0	1
	%	6.7%	0%	2.9%
40%	Count	1	0	1
	%	6.7%	0%	2.9%
45%	Count	0	1	1
	%	0%	5.0%	2.9%
50%	Count	0	1	1
	%	0%	5.0%	2.9%
60%	Count	2	0	2
	%	13.3%	0%	5.7%
70%	Count	1	0	1
	%	6.7%	0%	2.9%
90%	Count	1	0	1
	%	6.7%	0%	2.9%

8.3 Percentage (%) material read in Spanish and French				
percentage		Lecturers	Students	Total
1%	Count	0	1	1
	%	0%	5.0%	2.9%
2%	Count	1	1	2
	%	6.7%	5.0%	5.7%
3%	Count	0	1	1
	%	0%	5.0%	2.9%
5%	Count	0	2	2
	%	0%	10.0%	5.7%
8%	Count	0	1	1
	%	0%	5.0%	2.9%
10%	Count	0	4	4
	%	0%	20.0%	11.4%
20%	Count	4	4	8
	%	26.7%	20.0%	22.9%
25%	Count	1	0	1
	%	6.7%	0%	2.9%
30%	Count	1	1	2
	%	6.7%	5.0%	5.7%
40%	Count	1	0	1
	%	6.7%	0%	2.9%
50%	Count	0	2	2
	%	0%	10.0%	5.7%
55%	Count	1	0	1
	%	6.7%	0%	2.9%

		8.4 I cannot make any estimation		
		Lecturers	Students	Total
no estimation	Count	1	0	1
	%	5.0%	0%	2.9%

9. How would you rate the availability of relevant academic material in your research area and courses you teach? / in your subjects? Tick (✓) one box for each item.

		9.1 Relevant material Portuguese					
		excellent	good	sufficient	poor	none	Total
Lecturers	Count	1	9	5	0	0	15
	%	6.7%	60.0%	33.3%	0%	0%	100.0%
Students	Count	2	14	4	0	0	20
	%	10.0%	70.0%	20.0%	0%	0%	100.0%
Total	Count	3	23	9	0	0	35
	%	8.6	65.7%	25.7%	0%	0%	100.0%

		9.2 Relevant material English					
		excellent	good	sufficient	poor	none	Total
Lecturers	Count	1	10	4	0	0	15
	%	6.7%	66.7%	26.7	0%	0%	100.0%
Students	Count	0	12	5	3	0	20
	%	0%	60.0%	25.0%	15.0%	0%	100.0%
Total	Count	1	22	9	3	0	35
	%	2.9%	62.9%	25.7%	8.6%	0%	100.0%

		9.3 Relevant material Spanish				
		excellent	good	sufficient	poor	none
Lecturers	Count	0	6	3	1	0
	%	0%	40.0%	20.0%	6.7%	0%
Students	Count	0	7	5	1	0
	%	0%	35.0%	25.0%	5.0%	0%
Total	Count	0	13	8	2	0
	%	0%	37.1%	22.9%	5.7%	0%

		9.4 Relevant material French				
		excellent	good	sufficient	poor	none
Lecturers	Count	0	6	2	1	0
	%	0%	40.0%	13.3%	6.7%	0%
Students	Count	0	0	3	0	0
	%	0%	0%	15.0%	0%	0%
Total	Count	0	6	5	1	0
	%	0%	17.1%	14.3%	2.9%	0%

10. In which languages are the references on your reading lists? / the materials you get from the lecturers? Tick (✓) one or more boxes.

		10. Languages of reading lists		
		Portuguese	English	other
Lecturers	Count	15	11	10
	%	100%	73.3%	66.7%
Students	Count	20	18%	12
	%	100%	90.0%	60.0%
Total	Count	35	29	22
	%	100%	82.9%	62.9%

		10. Other languages of reading lists[1]	
		Spanish	French
Lecturers	Count	8	5
	%	53.3%	33.3%
Students	Count	13	4
	%	65.0%	20.0%
Total	Count	21	9
	%	60.0%	25.7%

[1] Some participants wrote two languages

11. What determines which texts you read for your academic work? / for your studies? Tick (✓) one or more boxes for each item.

		11. I read the texts in Portuguese which...								
		teaching list	interesting	not too difficult	references in papers[1]	colleagues recommend[1]	lecturers suggest[2]	lecturers insist[2]	easily available	other
Lecturers	Count	14	12	5	13	10	-	-	6	2
	%	93.3%	80.0%	33.3%	86.7%	66.7%			40.0%	13.3%
Students	Count	19	18	6	-	-	16	14	15	0
	%	95.0%	90.0%	30.0%			80.0%	70.0%	75.0%	0%
Total	Count	33	30	11	-	-	-	-	21	2
	%	94.3%	85.7%	31.4%					60.0%	5.7%

[1] only lecturers had this item
[2] only students had this item

		11. I read the texts in English which...								
		teaching list	interesting	not too difficult	references in papers[1]	colleagues recommend[1]	lecturers suggest[2]	lecturers insist[2]	easily available	other
Lecturers	Count	11	13	4	13	10	-	-	4	2
	%	73.3%	86.7%	26.7%	86.7%	66.7%			26.7%	13.3%
Students	Count	10	14	14	-	-	12	15	9	0
	%	50.0%	70.0%	70.0%			60.0%	75.0%	45.0%	0%
Total	Count	21	27	18	-	-	-	-	13	2
	%	60.0%	77.1%	51.4%					37.1%	5.7%

[1] only lecturers had this item
[2] only students had this item

		11. I read the texts in Spanish...								
		teaching list	interesting	not too difficult	references in papers[1]	colleagues recommend[1]	lecturers suggest[2]	lecturers insist[2]	easily available	other
Lecturers	Count	8	10	3	8	5	-	-	3	1
	%	53.3%	66.7%	20.0%	53.3%	33.3%			20.0%	6.7%
Students	Count	8	12	10	-	-	10	10	9	0
	%	40.0%	60.0%	50.0%			50.0%	50.0%	45.0%	0%
Total	Count	16	24	13	-	-	-	-	12	1
	%	45.7%	68.6%	37.1%					34.3%	2.9%

[1] only lecturers had this item
[2] only students had this item

		11. I read the texts in French...								
		teaching list	interesting	not too difficult	references in papers[1]	colleagues recommend[1]	lecturers suggest[2]	lecturers insist[2]	easily available	other
Lecturers	Count	3	7	2	6	5	-	-	1	0
	%	20.0%	46.7%	13.3%	40.0%	33.3%			6.7%	0%
Students	Count	1	2	4	-	-	1	4	2	0
	%	5.0%	10.0%	20.0%			5.0%	20.0%	10.0%	0%
Total	Count	4	9	6	-	-	-	-	3	0
	%	11.4%	25.7%	17.1%					8.6%	0%

[1] only lecturers had this item
[2] only students had this item

12. Tick (✓)two boxes for each item (one for English and one for Portuguese). Some of the academic texts I read...

		12.1 are borrowed from the college library							
		Portuguese				English			
		YES	NO	No answer	Total	YES	NO	No answer	Total
Lecturers	Count	13	1	1	15	14	0	1	15
	%	86.7%	6.7%	6.7%	100.0%	93.3%	%	6.7%	100.0%
Students	Count	19	1	0	20	15	5	0	20
	%	95.0%	5.0%	0%	100.0%	75.0%	25.0%	%	100.0%
Total	Count	32	2	1	35	29	5	1	35
	%	91.4%	5.7%	2.9%	100.0%	82.9%	14.3%	2.9%	100.0%

		12.2 are borrowed from other libraries							
		Portuguese				English			
		YES	NO	No answer	Total	YES	NO	No answer	Total
Lecturers	Count	6	7	2	15	6	7	2	15
	%	40.0%	46.7%	13.3%	100.0%	40.0%	46.7%	13.3%	100.0%
Students	Count	8	12	0	20	5	15	0	20
	%	40.0%	60.0%	0%	100.0%	25.0%	75.0%	%	100.0%
Total	Count	14	19	2	35	11	22	2	35
	%	40.0%	54.3%	5.7%	100.0%	31.4%	62.9%	5.7%	100.0%

		12.3 come from interlibrary loans							
		Portuguese				English			
		YES	NO	No answer	Total	YES	NO	No answer	Total
Lecturers	Count	4	10	1	15	3	11	1	15
	%	26.7%	66.7%	6.7%	100.0%	20.0%	73.3%	6.7%	100.0%
Students	Count	1	17	2	20	1	17	2	20
	%	5.0%	85.0%	10.0%	100.0%	5.0%	85.0%	10.0%	100.0%
Total	Count	5	27	3	35	4	28	3	35
	%	14.3%	77.1%	8.6%	100.0%	11.4%	80.0%	8.6%	100.0%

		12.4 are lent by colleagues							
		Portuguese				English			
		YES	NO	No answer	Total	YES	NO	No answer	Total
Lecturers	Count	11	3	1	15	9	5	1	15
	%	73.3%	20.0%	6.7%	100.0%	60.0%	33.3%	6.7%	100.0%
Students	Count	16	3	1	20	8	10	2	20
	%	80.0%	15.0%	5.0%	100.0%	40.0%	50.0%	10.0%	100.0%
Total	Count	27	6	2	35	17	15	3	35
	%	77.1%	17.1%	5.7%	100.0%	48.6%	42.9%	8.6%	100.0%

		12.5 belong to me.							
		Portuguese				English			
		YES	NO	No answer	Total	YES	NO	No answer	Total
Lecturers	Count	14	0	1	15	14	0	1	15
	%	93.3%	%	6.7%	100.0%	93.3%	%	6.7%	100.0%
Students	Count	20	0	0	20	9	10	1	20
	%	100.0%	%	%	100.0%	45.0%	50.0%	5.0%	100.0%
Total	Count	34	0	1	35	23	10	2	35
	%	97.1%	%	2.9%	100.0%	65.7%	28.6%	5.7%	100.0%

		12.6 are in the Internet							
		Portuguese				English			
		YES	NO	No answer	Total	YES	NO	No answer	Total
Lecturers	Count	9	3	3	15	10	3	2	15
	%	60.0%	20.0%	20.0%	100.0%	66.7%	20.0%	13.3%	100.0%
Students	Count	16	4	0	20	14	6	0	20
	%	80.0%	20.0%	%	100.0%	70.0%	30.0%	%	100.0%
Total	Count	25	7	3	35	24	9	2	35
	%	71.4%	20.0%	8.6%	100.0%	68.6%	25.7%	5.7%	100.0%

		12.7 other (specify)							
		Portuguese				English			
		YES	NO	No answer	Total	YES	NO	No answer	Total
Lecturers	Count	2	0	13	15	2	0	13	15
	%	13.3%	%	86.7%	100.0%	13.3%	%	86.7%	100.0%
Students	Count	3	1	16	20	3	1	16	20
	%	15.0%	5.0%	80.0%	100.0%	15.0%	5.0%	80.0%	100.0%
Total	Count	5	1	29	35	5	1	29	35
	%	14.3%	2.9%	82.9%	100.0%	14.3%	2.9%	82.9%	100.0%

13. How often do you borrow books from the college library? Tick (✓) one box for English and one box for Portuguese.

		13. Portuguese							
		everyday	once a week	several times a week	a few times a month	occasionally	never	other	Total
Lecturers	Count	0	1	0	5	6	0	3	15
	%	0%	6.7%	0%	33.3%	40.0%	0%	20.0%	100.0%
Students	Count	0	1	0	10	8	0	1	20
	%	0%	5.0%	0%	50.0%	40.0%	0%	5.0%	100.0%
Total	Count	0	2	0	15	14	0	4	35
	%	0%	5.7%	0%	42.9%	40.0%	0%	11.4%	100.0%

		13. English							
		everyday	once a week	several times a week	a few times a month	occasionally	never	other	Total
Lecturers	Count	0	0	0	5	6	0	4	15
	%	0%	0%	0%	33.3%	40.0%	0%	26.7%	100.0%
Students	Count	0	0	0	2	14	3	1	20
	%	0%	0%	0%	10.0%	70.0%	15.0%	5.0%	100.0%
Total	Count	0	0	0	7	20	3	5	35
	%	0%	0%	0%	20.0%	57.1%	8.6%	14.3%	100.0%

14. How often do you usually use the Internet? Tick (✓) one box.

		14. Internet							
		everyday	once a week	several times a week	a few times a month	occasionally	never	other	Total
Lecturers	Count	3	1	7	2	2	0	0	15
	%	20.0%	6.7%	46.7%	13.3%	13.3%	0%	0%	100.0%
Students	Count	0	4	10	4	1	0	1	20
	%	0%	20.0%	50.0%	20.0%	5.0%	0%	5.0%	100.0%
Total	Count	3	5	17	6	3	0	1	35
	%	8.6%	14.3%	48.6%	17.1%	8.6%	0%	2.9%	100.0%

15. In which languages do you read on the Internet? Tick (✓) <u>one or more</u> boxes. If you do not read in one of the languages leave a blank square.

		15. read on the Internet		
		Portuguese	English	Other
Lecturers	Count	15	15	11
	%	100.0%	100.0%	73.3%
Students	Count	20	16	5
	%	100.0%	80.0%	25.0%
Total	Count	35	31	16
	%	100.0%	88.6%	45.7%

		15. other languages read on the Internet[1]		
		Spanish	French	Italian
Lecturers	Count	11	8	2
	%	73.3%	53,3%	13.3%
Students	Count	4	3	0
	%	20.0%	15.0%	0%
Total	Count	15	11	2
	%	42.9%	31.4%	5.7%

[1] Some participants wrote two languages and two lecturers three languages.

16. What do you use the Internet for?

		16. uses of the Internet							
	Count %	email	references	information[1]	professional contacts	leisure/ personal	curiosities / news	software	chat groups
Lecturers	Count	7	9	12	2	5	1	1	0
	%	46.7%	60.0%	80.0%	13.3%	33.3%	6.7%	6.7%	0%
Students	Count	12	1	19	0	4	4	1	1
	%	60.0%	5.0%	95.0%	0%	20.0%	20.0%	5.0%	5.0%
Total	Count	19	10	31	2	9	5	2	1
	%	54.3%	28.6%	88.6%	5.7%	25.7%	14.3%	5.7%	2.9%

[1] Among those who mentioned information 3 lecturers referred to information related to pedagogical materials and 9 students information related to their college assignments.

17. How long do you think it takes you to read a medium size article (i.e. 6 pages) in English? Tick (✓) <u>one</u> box.

		17. read a medium size article in English				
		up to 30 min.	30-60 min.	more than 60 min.	I do not know	Total
Lecturers	Count	2	5	6	2	15
	%	13.3%	33.3%	40.0%	13.3%	100.0%
Students	Count	3	7	5	5	20
	%	15.0%	35.0%	25.0%	25.0%	100.0%
Total	Count	5	12	11	7	35
	%	14.3%	34.3%	31.4%	20.0%	100.0%

18. If you had to compare your reading speed in Portuguese and English how would you rate it? Tick (✓) one box.

		18. reading speed Portuguese (P) / English (E)				
		P as fast as E	P faster than E	E faster than P	Other	Total
Lecturers	Count	0	15	0	0	15
	%	0%	100.0%	0%	0%	100.0%
Students	Count	2	18	0	0	20
	%	10.0%	90.0%	0%	0%	100.0%
Total	Count	2	33	0	0	35
	%	5.7%	94.3%	0%	0%	100.0%

19. Tick (✓) one box for each item. When I read an academic text in Portuguese, I aim to...

		19.1 Portuguese: I aim to understand the text in detail					
		always	often	sometimes	seldom	never	Total
Lecturers	Count	2	4	9	0	0	15
	%	13.3%	26.7%	60.0%	0%	0%	100.0%
Students	Count	5	8	5	2	0	20
	%	25.0%	40.0%	25.0%	10.0%	0%	100.0%
Total	Count	7	12	14	2	0	35
	%	20.0%	34.3%	40.0%	5.7%	0%	100.0%

		19.2 Portuguese: I aim to understand the main points					
		always	often	sometimes	seldom	never	Total
Lecturers	Count	8	6	1	0	0	15
	%	53.3%	40.0%	6.7%	0%	0%	100.0%
Students	Count	17	3	0	0	0	20
	%	85.0%	15.0%	0%	0%	0%	100.0%
Total	Count	25	9	1	0	0	35
	%	71.4%	25.7%	2.9%	0%	0%	100.0%

		19.3 Portuguese: I aim to find a particular piece of information					
		always	often	sometimes	seldom	never	Total
Lecturers	Count	3	8	4	0	0	15
	%	20.0%	53.3%	26.7%	0%	0%	100.0%
Students	Count	4	13	3	0	0	20
	%	20.0%	65.0%	15.0%	0%	0%	100.0%
Total	Count	7	21	7	0	0	35
	%	20.0%	60.0%	20.0%	0%	0%	100.0%

		19.4 Portuguese: I aim to check a particular piece of information					
		always	often	sometimes	seldom	never	Total
Lecturers	Count	2	7	6	0	0	15
	%	13.3%	46.7%	40.0%	0%	0%	100.0%
Students	Count	1	11	4	4	0	20
	%	5.0%	55.0%	20.0%	20.0%	0%	100.0%
Total	Count	3	18	10	4	0	35
	%	8.6%	51.4%	28.6%	11.4%	0%	100.0%

		19.5 Portuguese: I aim to...other					
		always	often	sometimes	seldom	never	Total
Lecturers	Count	0	0	0	0	0	15
	%	0%	0%	0%	0%	0%	100.0%
Students	Count	0	0	1	0	0	20
	%	0%	0%	5.0%	0%	0%	100.0%
Total	Count	0	0	1	0	0	35
	%	0%	0%	2.9%	0%	0%	100.0%

20. Tick (✓) one box for each item. When I read an academic text in English, I aim to...

		20.1 English: I aim to understand the text in detail					
		always	often	sometimes	seldom	never	Total
Lecturers	Count	1	2	6	2	1	15
	%	6.7%	13.3%	40.0%	13.3%	6.7%	100.0%
Students	Count	0	3	5	3	2	20
	%	0%	15.0%	25.0%	15.0%	10.0%	100.0%
Total	Count	1	5	11	5	3	35
	%	2.9%	14.3%	31.4%	14.3%	8.6%	100.0%

		20.2 English: I aim to understand the main points					
		always	often	sometimes	seldom	never	Total
Lecturers	Count	6	7	2	0	0	15
	%	40.0%	46.7%	13.3%	0%	0%	100.0%
Students	Count	12	6	2	0	0	20
	%	60.0%	30.0%	10.0%	0%	0%	100.0%
Total	Count	18	13	4	0	0	35
	%	51.4%	37.1%	11.4%	0%	0%	100.0%

		20.3 English: I aim to find a particular piece of information					
		always	often	sometimes	seldom	never	Total
Lecturers	Count	5	7	3	0	0	15
	%	33.3%	46.7%	20.0%	0%	0%	100.0%
Students	Count	3	11	4	2	0	20
	%	15.0%	55.0%	20.0%	10.0%	0%	100.0%
Total	Count	8	18	7	2	0	35
	%	22.9%	51.4%	20.0%	5.7%	0%	100.0%

		20.4 English: I aim to check a particular piece of information						
		no answer	always	often	sometimes	seldom	never	Total
Lecturers	Count	1	3	7	4	0	0	15
	%	6.7%	20.0%	46.7%	26.7%	0%	0%	100.0%
Students	Count	0	0	8	5	5	2	20
	%	0%	0%	40.0%	25.0%	25.0%	10.0%	100.0%
Total	Count	1	3	15	9	5	2	35
	%	2.9%	8.6%	42.9%	25.7%	14.3%	5.7%	100.0%

21. While you read an academic text for your studies what do you do to help you understand the text? Tick (✓) one or more boxes.

	Count %	21. I… to help me understand the text									
		colour marker	notes margin	read 1^{st} and last paragr.	1^{st} line each paragr.	highlight opposing ideas	find connectors	make notes	summarise	read more than once	other
LL	Count	12	13	0	1	2	1	13	7	13	0
	%	80%	86.7%	0%	6.7%	13.3%	6.7%	86.7%	46.7%	86.7%	0%
SS	Count	16	15	0	2	7	0	18	8	14	0
	%	80.0%	75.0%	0%	10.0%	35.0%	0%	90.0%	40.0%	70.0%	0%
Total	Count	28	28	0	3	9	1	31	15	27	0
	%	80.0%	80.0%	0%	8.6%	25.7%	2.9%	88.6%	42.9%	77.1%	0%

LL = Lecturers; SS = Students

22. What do you usually do when you encounter an unfamiliar word when you read an academic text in English? Tick (✓) one box for each item.

		22.1 unfamiliar word: ignore			
		always	often	sometimes	never
Lecturers	Count	0	1	10	3
	%	0%	6.7%	66.7%	20.0%
Students	Count	0	3	11	5
	%	0%	15.0%	55.0%	25.0%
Total	Count	0	4	21	8
	%	0%	11.4%	60.0%	22.9%

		22.2 unfamiliar word: guess from context			
		always	often	sometimes	never
Lecturers	Count	0	13	2	0
	%	0%	86.7%	13.3%	0%
Students	Count	0	13	3	0
	%	0%	65.0%	15.0%	0%
Total	Count	0	26	5	0
	%	0%	74.3%	14.3%	0%

		22.3 unfamiliar word: work out meaning - structure of the word			
		always	often	sometimes	never
Lecturers	Count	1	3	8	2
	%	6.7%	20.0%	53.3%	13.3%
Students	Count	2	4	9	5
	%	10.0%	20.0%	45.0%	25.0%
Total	Count	3	7	17	7
	%	8.6%	20.0%	48.6%	20.0%

		22.4 unfamiliar word: monolingual dictionary			
		always	often	sometimes	never
Lecturers	Count	1	3	6	5
	%	6.7%	20.0%	40.0%	33.3%
Students	Count	0	8	8	4
	%	0%	40.0%	40.0%	20.0%
Total	Count	1	11	14	9
	%	2.9%	31.4%	40.0%	25.7%

		22.5 unfamiliar word: bilingual dictionary			
		always	often	sometimes	never
Lecturers	Count	2	8	4	0
	%	13.3%	53.3%	26.7%	0%
Students	Count	1	6	13	0
	%	5.0%	30.0%	65.0%	0%
Total	Count	3	14	17	0
	%	8.6%	40.0%	48.6%	0%

		22.6 unfamiliar word: Internet dictionary			
		always	often	sometimes	never
Lecturers	Count	0	0	3	11
	%	0%	0%	20.0%	73.3%
Students	Count	0	0	3	17
	%	0%	0%	15.0%	85.5%
Total	Count	0	0	6	28
	%	0%	0%	17.1%	80.0%

		22.7 unfamiliar word: ask someone			
		always	often	sometimes	never
Lecturers	Count	0	1	11	2
	%	0%	6.7%	73.3%	13.3%
Students	Count	0	9	10	1
	%	0%	45.0%	50.0%	5.0%
Total	Count	0	10	21	3
	%	0%	28.6%	60.0%	8.6%

		22.8 unfamiliar word: other			
		always	often	sometimes	never
Lecturers	Count	0	1	0	0
	%	0%	6.7%	0%	0%
Students	Count	0	0	0	0
	%	0%	0%	0%	0%
Total	Count	0	1	0	0
	%	0%	2.9%	0%	0%

23. When do you use a dictionary? Tick (✓) one or more boxes.

		23. dictionary					
		unfamiliar word	prevents understand sentence	word more than once	need to know meaning word	never	other
Lecturers	Count	3	14	9	5	0	2
	%	20.0%	93.3%	60.0%	33.3%	0%	13.3%
Students	Count	7	15	15	10	0	0
	%	35.0%	75.0%	75.0%	50.0%	0%	0%
Total	Count	10	29	24	15	0	2
	%	28.6%	82.9%	68.6%	42.9%	0%	5.7%

24. What do you do while reading an academic text in English if you feel that you are not understanding the text? Tick (✓)one or more boxes.

		24. feel you are not understanding the text								
		read again	give up	carry on reading	read several times	ask someone	use dictionary	make notes	summarise	other
Lecturers	Count	13	0	6	12	5	11	5	3	2
	%	86.7%	0%	40.0%	80.0%	33.3%	73.3%	33.3%	20.0%	13.3%
Students	Count	16	2	1	11	11	12	8	5	0
	%	80.0%	10.0%	50.0%	55.0%	55.0%	60.0%	40.0%	25.0%	0%
Total	Count	29	2	7	23	16	23	13	8	2
	%	82.9%	5.7%	20.0%	65.7%	45.7%	65.7%	37.1%	22.9%	5.7%

25. What would prevent you from reading an academic text in English? Tick (✓) one or more boxes.

		25. prevent reading an academic text in English				
		my level of English	too time consuming	equivalent text in Portuguese	text translated into Portuguese	other
Lecturers	Count	3	5	7	9	3
	%	20.0%	33.3%	46.7%	60.0%	20.0%
Students	Count	5	12	15	14	0
	%	25.0%	60.0%	75.0%	70.0%	0%
Total	Count	8	17	22	23	3
	%	22.9%	48.6%	62.9%	65.7%	8.6%

26. Are there any other comments about reading you would like to make?

Comments on reading		Lecturers	Students	Total
1. Few books recommended in English due to students' difficulty.	Count %	2 13.3%	-	-
2. Few books recommended in English due to students' disinterest.	Count %	1 6.7%	-	-
3. Few books recommended in French due to students' difficulty.	Count %	1 6.7%	-	-
4. Reading is English is a necessity.	Count %	3 20.0%	1 5.0%	4 11.4%
5. Prefer to read in Portuguese.	Count %	1 6.7%	1 5.0%	2 5.7%
6. More time needed to read in English.	Count %	2 13.3%	0 0%	2 5.7%
7. More difficult to read in English than in Portuguese.	Count %	3 20.0%	1 5.0%	4 11.4%
8. Difficulty with vocabulary in English (e.g. technical vocabulary).	Count %	2 13.3%	0 0%	1 2.9%
9. Difficulty with American vs British English.	Count %	0 0%	1 5.0%	1 2.9%
10. Like reading specially non-academic texts.	Count %	0 0%	3 15.0%	3 8.6%
11. Lecturers ask for most of the existing books in the college library.	Count %	1 6.7%	-	-
12. There are books and journals English in the college library of great interest for the different courses taught.	Count %	1 6.7%	0 0%	1 2.9%

APPENDIX 17

Cloze test results

Results were analysed using SPSS version 10.0

Descriptives

	Type			Statistic	Std. Error
Level	**LL** (lecturers)	Mean		6.00	.44
		95% Confidence interval for mean	Lower bound	5.06	
			Upper bound	6.94	
		Std. Deviation		1.69	
		Minimum		2	
		Maximum		9	
Level	**SS** (students)	Mean		4.95	.47
		95% Confidence interval for mean	Lower bound	3.96	
			Upper bound	5.94	
		Std. Deviation		2.11	
		Minimum		1	
		Maximum		10	

Stem-and-Leaf Plots

Level Stem-and-Leaf Plot for **type** = **LL**

Frequency	Stem and leaf	
2.00	Extremes	(=<3.0)
1.00	5	0
.00	5	
6.00	6	000000
.00	6	
5.00	7	00000
1.00	Extremes	(>=9.0)
Stem width:		1
Each leaf:		1 case

Level Stem-and-Leaf Plot for **type** = **SS**

Frequency	Stem and leaf	
2.00	Extremes	(=<1.0)
2.00	3	00
3.00	4	000
6.00	5	000000
4.00	6	0000
1.00	7	0
1.00	8	0
1.00	Extremes	(>=10.0)
Stem width:		1
Each leaf:		1 case

Placement test results: individual scores

Participant	Level	Level description
L1	6	Intermediate 3
L2	6	Intermediate 3
L3	7	Upper 1
L4	6	Intermediate 3
L5	6	Intermediate 3
L6	9	Upper 3
L7	6	Intermediate 3
L8	6	Intermediate 3
L9	7	Upper 1
L10	7	Upper 1
L11	3	Elementary 2
L12	2	Elementary 1
L13	7	Upper 1
L14	7	Upper 1
L15	5	Intermediate 2
S1	5	Intermediate 2
S2	5	Intermediate 2
S3	6	Intermediate 3
S4	4	Intermediate 1
S5	10	Proficiency
S6	5	Intermediate 2
S7	6	Intermediate 3
S8	1	Beginner
S9	8	Upper 2
S10	4	Intermediate 1
S11	1	Beginner
S13	5	Intermediate 2
S14	4	Intermediate 1
S15	3	Elementary 2
S16	5	Intermediate 2
S17	6	Intermediate 3
S18	5	Intermediate 2
S19	7	Upper 1
S20	3	Elementary 2
S21	6	Intermediate 3

APPENDIX 18

Results: Pre- and post-tests 3 and 4

Results were analysed using SPSS version 10.0

Pre- and post-test 3 results

Table 1: Results using a seven-level band descriptor

Band		Lecturers Pre-test	Lecturers Post-test	Students Pre-test	Students Post-test
1	Count	0	0	0	0
	%	0%	0%	0%	0%
2	Count	7	10	0	2
	%	46.7%	66.7%	0%	10.0%
3	Count	3	2	2	7
	%	20.0%	13.3%	10.0%	35.0%
4	Count	3	2	1	0
	%	20.0%	13.3%	5.0%	0%
5	Count	1	1	7	5
	%	6.7%	6.7%	35.0%	25.0%
6	Count	1	0	5	5
	%	6.7%	0%	25.0%	25.0%
7	Count	0	0	5	1
	%	0%	0%	25.0%	5.0%
Total		15	15	20	20
		100.0%	100.0%	100.0%	100.0%

Table 2: Band improvement in test 3

N° of bands that participants moved up		Lecturers	Students
0		10	8
		66.7%	40.0%
1	Count	3	6
	%	20.0%	30.0%
2	Count	2	2
	%	13.3%	10.0%
3	Count	0	3
	%	0%	15.0%
4	Count	0	1
	%	0%	5.0%
Total		15	20
		100.0%	100.0%

Pre- and post- test 4 results

Table 3: Question 1: Identifying type of text

Question 1 (Unit 1: Journal articles and textbooks)					
		Lecturers		Students	
		Pre-test	Post-test	Pre-test	Post-test
Correct	Count	11	11	5	15
	%	73.3%	73.3%	25.0%	75.0%
Partially correct	Count	3	4	13	4
	%	20.0%	26.7%	65.0%	20.0%
Incorrect	Count	1	0	2	1
	%	6.7%	0%	10.0%	5.0%
Total		15	15	20	20
		100.0%	100.0%	100.0%	100.0%

Table 4: Question 2: Labelling different sentences

Question 2 (Unit 2: Reviews, previews and action markers)					
correct out of 7		Lecturers		Students	
		Pre-test	Post-test	Pre-test	Post-test
0	Count	0	0	2	0
	%	0%	0%	10.0%	0%
1	Count	0	0	0	0
	%	0%	0%	0%	0%
2	Count	2	0	3	1
	%	13.3%	0%	15.0%	5.0%
3	Count	2	0	3	0
	%	13.3%	0%	15.0%	0%
4	Count	3	3	3	4
	%	20.0%	20.0%	15.0%	20.0%
5	Count	5	8	3	6
	%	33.3%	53.3%	15.0%	30.0%
6	Count	3	2	6	5
	%	20.0%	13.3%	30.0%	25.0%
7	Count	0	2	0	4
	%	0%	13.3%	0%	20.0%
Total		15	15	20	20
		100.0%	100.0%	100.0%	100.0%

Table 5: Question 3: Multiple choice

Question 3 (Unit 3: Connectors)					
correct out of 4		Lecturers		Students	
		Pre-test	Post-test	Pre-test	Post-test
0	Count	0	0	0	0
	%	0%	0%	0%	0%
1	Count	0	2	5	1
	%	0%	13.3%	25.0%	5.0%
2	Count	2	3	9	5
	%	13.3%	20.0%	45.0%	25.0%
3	Count	10	3	6	10
	%	66.7%	20.0%	30.0%	50.0%
4	Count	3	7	0	4
	%	20.0%	46.7%	0%	20.0%
Total		15	15	20	20
		100.0%	100.0%	100.0%	100.0%

Table 6: Question 4: Choosing one of two alternatives

Question 4 (Unit 4: Discourse structuring words)					
correct out of 4		Lecturers		Students	
		Pre-test	Post-test	Pre-test	Post-test
0	Count	0	0	0	0
	%	0%	0%	0%	0%
1	Count	0	0	0	1
	%	0%	0%	0%	5.0%
2	Count	1	1	3	3
	%	6.7%	6.7%	15.0%	15.0%
3	Count	3	3	7	5
	%	20.0%	20.0%	35.0%	25.0%
4	Count	11	11	10	11
	%	73.3%	73.3%	50.0%	55.0%
Total		15	15	20	20
		100.0%	100.0%	100.0%	100.0%

Table 7: Question 5: Choosing one of two explanations

Question 5 (Unit 5: Noun chains)					
correct out of 5		Lecturers		Students	
		Pre-test	Post-test	Pre-test	Post-test
0	Count	0	0	0	0
	%	0%	0%	0%	0%
1	Count	0	0	0	0
	%	0%	0%	0%	0%
2	Count	0	0	2	1
	%	0%	0%	10.0%	5.0%
3	Count	0	1	4	2
	%	0%	6.7%	20.0%	10.0%
4	Count	4	3	6	9
	%	26.7%	20.0%	30.0%	45.0%
5	Count	11	11	8	8
	%	73.3%	73.3%	40.0%	40.0%
Total		15	15	20	20
		100.0%	100.0%	100.0%	100.0%

Table 8: Question 6: Matching terms with their definitions

Question 6 (Unit 6: Nominalisation)					
correct out of 4		Lecturers		Students	
		Pre-test	Post-test	Pre-test	Post-test
0	Count	0	0	0	0
	%	0%	0%	0%	0%
1	Count	0	0	0	0
	%	0%	0%	0%	0%
2	Count	3	0	4	0
	%	20.0%	0%	20.0%	0%
3	Count	1	0	1	0
	%	6.7%	0%	5.0%	0%
4	Count	11	15	15	20
	%	73.3%	100.0%	75.0%	100.0%
Total		15	15	20	20
		100.0%	100.0%	100.0%	100.0%

Table 9: Question 7.1: Choosing the research article title from five given titles after reading the introduction to the research article

Question 7.1 (Unit 9: Thesis statement)					
		Lecturers		Students	
		Pre-test	Post-test	Pre-test	Post-test
Correct	Count	8	8	7	7
	%	53.3%	53.3%	35.0%	35.0%
Incorrect	Count	7	7	13	13
	%	46.7%	46.7%	65.0%	65.0%
Total		15	15	20	20
		100.0%	100.0%	100.0%	100.0%

Table 10: Question 7.2: Underlining the sentence(s) that helped with the previous choice

Question 7.2 (Unit 9: Thesis statement)					
		Lecturers		Students	
		Pre-test	Post-test	Pre-test	Post-test
Correct	Count	7	6	3	13
	%	46.7%	40.0%	15.0%	65.0%
Incomplete	Count	1	5	3	2
	%	6.7%	33.3%	15.0%	10.0%
redundant information	Count	4	1	3	4
	%	26.7%	6.7%	15.0%	20.0%
incomplete + redundant information	Count	1	0	2	0
	%	6.7%	0%	10.0%	0%
Incorrect	Count	2	3	9	1
	%	13.3%	20.0%	45.0%	5.0%
Total		15	15	20	20
		100.0%	100.0%	100.0%	100.0%

Table 11: Question 8: Choosing in which of two sentences the author is less committed to the proposition

Question 8 (Unit 8: Reporting verbs)					
correct out of 4		Lecturers		Students	
		Pre-test	Post-test	Pre-test	Post-test
0	Count	1	0	2	2
	%	6.7%	0%	10.0%	10.0%
1	Count	1	0	4	0
	%	6.7%	0%	20.0%	0%
2	Count	1	0	3	2
	%	6.7%	0%	15.0%	10.0%
3	Count	3	0	6	0
	%	20.0%	0%	30.0%	0%
4	Count	9	15	5	16
	%	60.0%	100.0%	25.0%	80.0%
Total		15	15	20	20
		100.0%	100.0%	100.0%	100.0%

Table 12: Question 9: Matching given topic sentences with paragraphs

Question 9 (Unit 9: Topic sentences)					
correct out of 3		Lecturers		Students	
		Pre-test	Post-test	Pre-test	Post-test
0	Count	0	0	1	1
	%	0%	0%	5.0%	5.0%
1	Count	6	2	10	1
	%	40.0%	13.3%	50.0%	5.0%
2	Count	0	1	1	2
	%	0%	6.7%	5.0%	10.0%
3	Count	9	12	8	16
	%	60.0%	80.0%	40.0%	80.0%
Total		15	15	20	20
		100.0%	100.0%	100.0%	100.0%

Table 13: Question 10: Ranking sentences according to tentativeness of the statement

Question 13 (Unit 7: Hedging)					
correct out of 5		Lecturers		Students	
		Pre-test	Post-test	Pre-test	Post-test
0	Count	0	0	2	2
	%	0%	0%	10.0%	10.0%
1	Count	2	0	3	2
	%	13.3%	0%	15.0%	10.0%
2	Count	1	2	0	2
	%	6.7%	13.3%	0%	10.0%
3	Count	4	5	7	6
	%	26.7%	33.3%	35.0%	30.0%
4	Count	0	0	0	0
	%	0%	0%	0%	0%
5	Count	8	8	8	8
	%	53.3%	53.3%	40.0%	40.0%
Total		15	15	20	20
		100.0%	100.0%	100.0%	100.0%

Table 14: Question 11: Labelling paragraphs with headings given in a box

Question 11 (Unit 1: Journal articles and textbooks)					
correct out of 4		Lecturers		Students	
		Pre-test	Post-test	Pre-test	Post-test
0	Count	0	0	6	0
	%	0%	0%	30.0%	0%
1	Count	1	2	2	3
	%	6.7%	13.3%	10.0%	15.0%
2	Count	2	5	2	7
	%	13.3%	33.3%	10.0%	35.0%
3	Count	0	0	0	1
	%	0%	0%	0%	5.0%
4	Count	12	8	10	9
	%	80.0%	53.3%	50.0%	45.0%
Total		15	15	20	20
		100.0%	100.0%	100.0%	100.0%

Table 15: Question 12: Replacing the connector in the sentence with another connector

		Question 12 (Unit 3: Connectors)			
correct out of 3		Lecturers		Students	
		Pre-test	Post-test	Pre-test	Post-test
0	Count	7	4	16	8
	%	46.7%	26.7%	80.0%	40.0%
1	Count	6	3	2	11
	%	40.0%	20.0%	10.0%	55.0%
2	Count	1	6	1	1
	%	6.7%	40.0%	5.0%	5.0%
3	Count	1	2	1	0
	%	6.7%	13.3%	5.0%	0%
Total		15	15	20	20
		100.0%	100.0%	100.0%	100.0%

Table 16: Question 13: Writing the noun corresponding to an action or process defined (correct choice of base term)

		Question 13 (Unit 6: Nominalisation)			
correct out of 5		Lecturers		Students	
		Pre-test	Post-test	Pre-test	Post-test
0	Count	0	0	0	0
	%	0%	0%	0%	0%
1	Count	0	0	1	0
	%	0%	0%	5.0%	0%
2	Count	0	0	0	0
	%	0%	0%	0%	0%
3	Count	1	1	2	0
	%	6.7%	6.7%	10.0%	0%
4	Count	1	0	0	1
	%	6.7%	0%	0%	5.0%
5	Count	13	14	17	19
	%	86.7%	93.3%	85.0%	95.0%
Total		15	15	20	20
		100.0%	100.0%	100.0%	100.0%

Table 17: Question 13: Writing the noun corresponding to an action or process defined (correct choice of base term and correct word formation)

Question 13 (Unit 6: Nominalisation)					
correct out of 5		Lecturers		Students	
		Pre-test	Post-test	Pre-test	Post-test
0	Count	0	0	1	4
	%	0%	0%	5.0%	20.0%
1	Count	5	0	9	0
	%	33.3%	0%	45.0%	0%
2	Count	0	1	1	3
	%	0%	6.7%	5.0%	15.0%
3	Count	4	1	5	6
	%	26.7%	6.7%	25.0%	30.0%
4	Count	3	11	4	7
	%	20.0%	73.3%	20.0%	35.0%
5	Count	3	2	0	0
	%	20.0%	13.3%	0%	0%
Total		15 100.0%	15 100.0%	20 100.0%	20 100.0%

APPENDIX 19

Results: Feedback questionnaires

Results were analysed using SPSS version 10.0.

Unit 1

Subjects' perception of five statements (1-5):

1. The topic of the unit was new to me

		Yes	No	Unsure
Lecturers	Count	5	8	2
	%	33.3%	53.3%	13.3%
Students	Count	8	9	3
	%	40.0%	45.0%	15.0%

2. I think I have learnt something useful in this unit

		Yes	No	Unsure
Lecturers	Count	14	1	0
	%	93.3%	6.7%	0%
Students	Count	20	0	0
	%	100.0%	0%	0%

3. Being aware of the topic of the unit will be useful in reading academic English

		Yes	No	Unsure
Lecturers	Count	13	1	1
	%	86.7%	6.7%	6.7%
Students	Count	16	0	4
	%	80.0%	0%	20.0%

4. I will use the content of the unit for other purposes than reading academic English

		Yes	No	Unsure
Lecturers	Count	11	2	2
	%	73.3%	13.3%	13.3%
Students	Count	14	0	6
	%	70.0%	0%	30.0%

5. I would benefit from learning more on this topic

		Yes	No	Unsure
Lecturers	Count	6	3	6
	%	40.0%	20.0%	40.0%
Students	Count	7	3	10
	%	35.0%	15.0%	50.0%

Participants who answered yes to 4 and/or 5 were asked to explain their choice.

4. I will use the content of the unit for other purposes than reading academic English			
Coding		**Total**	
		LL	**SS**
1.Writing academic texts	Count	4	6
	%	26.7%	30.0%
2. Writing degree project report	Count	0	4
	%	0%	20.0%
3. Reading in other languages than English	Count	2	3
	%	13.3%	15.0%
4. Informing students	Count	1	0
	%	6.7%	0%
5. Classifying /understanding genres	Count	3	1
	%	20.0%	5.0%
6. Criticising the structure of texts written by others	Count	1	0
	%	6.7%	0%
7. Structuring texts	Count	1	0
	%	6.7%	0%

5. I would benefit from learning more on this topic			
Coding		**Total**	
		LL	**SS**
1. Writing articles	Count	4	1
	%	26.7%	5.0%
2. Reading more efficiently	Count	1	0
	%	6.7%	0%
3. Recognising genre differences	Count	0	1
	%	0%	5.0%
4. Seeing text in a different way	Count	0	2
	%	0%	10.0%
5. Understanding texts better	Count	0	1
	%	0%	5.0%
6. Learning more	Count	1	2
	%	6.7%	10.0%

Participants were invited to state what topic strategies/knowledge they might use next time they read.

6.What I have learnt from this unit that I will use next time I read...			
Coding		**Total**	
		LL	**SS**
1. Identifying different academic genres	Count	6	10
	%	40.0%	50.0%
2. Identifying structure of academic genres	Count	4	14
	%	26.7%	70.0%
3. Selecting whether or what to read in a text	Count	3	7
	%	20.0%	35.0%

LL = lecturers SS = students

Unit 2

Subjects' perception of five statements (1-5):

1. The topic of the unit was new to me				
		Yes	No	Unsure
Lecturers	Count	12	0	3
	%	80.0%	0%	20.0%
Students	Count	17	1	2
	%	85.0%	5.0%	10.0%

2. I think I have learnt something useful in this unit				
		Yes	No	Unsure
Lecturers	Count	12	1	2
	%	80.0%	6.7%	13.3%
Students	Count	18	2	0
	%	90.0%	10.0%	0%

3. Being aware of the topic of the unit will be useful in reading academic English				
		Yes	No	Unsure
Lecturers	Count	13	0	2
	%	86.7%	0%	13.3%
Students	Count	12	0	8
	%	60.0%	0%	40.0%

4. I will use the content of the unit for other purposes than reading academic English					
		Yes	No	Unsure	Missing
Lecturers	Count	8	2	4	1
	%	53.3%	13.3%	26.7%	6.7%
Students	Count	8	1	11	0
	%	40.0%	5.0%	55.0%	0%

5. I would benefit from learning more on this topic					
		Yes	No	Unsure	Missing
Lecturers	Count	3	2	9	1
	%	20.0%	13.3%	60.0%	6.7%
Students	Count	6	2	12	0
	%	30.0%	10.0%	60.0%	0%

Participants who answered yes to 4 and/or 5 they were asked to explain their choice.

4. I will use the content of the unit for other purposes than reading academic English			
Coding		Total	
		LL	SS
1. Reading texts	Count	2	6
	%	13.3%	30%
2. Reading in other languages than English	Count	2	2
	%	13.3%	10.0%
3. Writing in English	Count	0	1
	%	0%	5.0%
4. Writing	Count	5	1
	%	33.3%	5.0%
5. Writing for students	Count	1	0
	%	6.7%	0%
6. Summarising texts	Count	1	0
	%	6.7%	0%

5. I would benefit from learning more on this topic			
Coding		Total	
		LL	SS
1. Help to interpret text better	Count	1	4
	%	6.7%	20.0%
2. Help in writing	Count	1	1
	%	6.7%	5.0%

Participants were invited to state what topic strategies/knowledge they might use next time they read.

6.What I have learnt from this unit that I will use next time I read...			
Coding		Total	
		LL	SS
1. Noticing metatext	Count	8	10
	%	53.3%	50.0%
2. Looking for metatext to understand the organisation of the text	Count	4	4
	%	26.7%	20.0%
3. Understanding texts better	Count	5	10
	%	33.3%	50.0%
4. Scanning texts	Count	2	6
	%	13.3%	30.0%
5. Understanding relations between different parts of the text	Count	1	0
	%	6.7%	0%
6. Noticing differences between Portuguese and English	Count	1	0
	%	6.7%	0%

Unit 3

Subjects' perception of five statements (1-5):

1. The topic of the unit was new to me

		Yes	No	Unsure
Lecturers	Count	8	2	5
	%	53.3%	13.3%	53.3%
Students	Count	10	8	2
	%	50.0%	40.0%	10.0%

2. I think I have learnt something useful in this unit

		Yes	No	Unsure
Lecturers	Count	14	0	1
	%	93.3%	0%	6.7%
Students	Count	19	0	1
	%	95.0%	0%	5.0%

3. Being aware of the topic of the unit will be useful in reading academic English

		Yes	No	Unsure
Lecturers	Count	11	1	3
	%	73.3%	6.7%	20.0%
Students	Count	16	0	4
	%	80.0%	0%	20.0%

4. I will use the content of the unit for other purposes than reading academic English

		Yes	No	Unsure	Missing
Lecturers	Count	10	4	1	0
	%	66.7%	26.7%	6.7%	0%
Students	Count	6	0	13	1
	%	30.0%	0%	65.0%	5.0%

5. I would benefit from learning more on this topic

		Yes	No	Unsure	Missing
Lecturers	Count	5	1	9	0
	%	33.3%	6.7%	60%	0%
Students	Count	8	1	10	1
	%	40.0%	5.0%	50.0%	5.0%

Participants who answered yes to 4 and/or 5 were asked to explain their choice.

4. I will use the content of the unit for other purposes than reading academic English			
Coding		**Total**	
		LL	**SS**
1. Reading non-academic texts	Count	1	3
	%	6.7%	15.0%
2. Reading texts	Count	2	2
	%	13.3%	10.0%
3. Reading in other languages than English	Count	1	1
	%	6.7%	5.0%
4. Writing in English	Count	3	1
	%	20.0%	5.0%
5. Writing	Count	4	1
	%	26.7%	5.0%

5. I would benefit from learning more on this topic			
Coding		**Total**	
		LL	**SS**
1. Understanding the meaning of different connectors	Count	2	1
	%	13.3%	5.0%
2. More exercises needed	Count	2	0
	%	13.3%	0%
3. Understanding texts better	Count	0	5
	%	0%	25.0%
4. Learning how to use connectors	Count	1	1
	%	6.7%	5.0%
5. Understanding relations between ideas in texts	Count	1	3
	%	6.7%	15.0%

Participants were invited to state what topic strategies/knowledge they might use next time they read.

6.What I have learnt from this unit that I will use next time I read...			
Coding		**Total**	
		LL	**SS**
1. Noticing connectors	Count	4	7
	%	26.7%	35.0%
2. Understanding relations between ideas in a text	Count	4	2
	%	26.7%	10.0%
3. Understanding the meaning of connectors	Count	3	0
	%	20.0%	0%
4. Understanding texts better	Count	2	9
	%	13.3%	45.0%
5. Use of connectors	Count	1	2
	%	6.7%	10.0%
6. Scanning texts	Count	0	2
	%	0%	10.0%
7. Guiding reading	Count	0	3
	%	0%	15.0%

Unit 4

Subjects' perception of five statements (1-5):

1. The topic of the unit was new to me				
		Yes	No	Unsure
Lecturers	Count	10	1	4
	%	66.7%	6.7%	26.7%
Students	Count	18	0	2
	%	90.0%	0%	10.0%

2. I think I have learnt something useful in this unit				
		Yes	No	Unsure
Lecturers	Count	14	0	1
	%	93.3%	0%	6.7%
Students	Count	18	0	2
	%	90.0%	0%	10.0%

3. Being aware of the topic of the unit will be useful in reading academic English				
		Yes	No	Unsure
Lecturers	Count	13	0	2
	%	86.7%	0%	13.3%
Students	Count	15	0	5
	%	75.0%	0%	25.0%

4. I will use the content of the unit for other purposes than reading English					
		Yes	No	Unsure	Missing
Lecturers	Count	6	4	5	0
	%	40.0%	26.7%	33.3%	0%
Students	Count	4	1	14	1
	%	20.0%	5.0%	70.0%	5.0%

5. I would benefit from learning more on this topic					
		Yes	No	Unsure	Missing
Lecturers	Count	3	2	9	1
	%	20.0%	13.3%	60.0%	6.7%
Students	Count	7	0	12	1
	%	35.0%	0%	60.0%	5.0%

Participants who answered yes to 4 and/or 5 were asked to explain their choice.

4. I will use the content of the unit for other purposes than reading academic English			
Coding		Total	
		LL	SS
1. Reading texts	Count	1	4
	%	6.7%	20.0%
2. Reading in other languages than English	Count	2	2
	%	13.3%	10.0%
3. Writing in English	Count	4	0
	%	26.7%	0%
4. Writing	Count	1	0
	%	6.7%	0%

5. I would benefit from learning more on this topic			
Coding		Total	
		LL	SS
1. Help to interpret texts better	Count	2	5
	%	13.3%	25.0%
2. More exercises needed	Count	1	0
	%	6.7%	0%
3. Help in writing	Count	0	2
	%	0%	10.0%
4. Did not fully understand the topic	Count	1	0
	%	6.7%	0%

Participants were invited to state what topic strategies/knowledge they might use next time they read.

6.What I have learnt from this unit that I will use next time I read...			
Coding		Total	
		LL	SS
1. Noticing discourse structuring words	Count	8	5
	%	53.3%	25.0%
2. Understanding relations between ideas in a text	Count	3	3
	%	20.0%	15.0%
3 Understanding texts better	Count	5	9
	%	33.3%	45.0%
4. Locating information in the text	Count	1	4
	%	6.7%	20.0%
5. Noticing text organisation	Count	1	3
	%	6.7%	15.0%
6. Guiding reading	Count	0	2
	%	0%	10.0%

Unit 5

Subjects' perception of five statements (1-5):

1. The topic of the unit was new to me		Yes	No	Unsure
Lecturers	Count	11	3	1
	%	73.3%	20.0%	6.7%
Students	Count	16	1	3
	%	80.0%	5.0%	15.0%

2. I think I have learnt something useful in this unit		Yes	No	Unsure
Lecturers	Count	14	0	1
	%	93.3%	0%	6.7%
Students	Count	16	0	4
	%	80.0%	0%	20.0%

3. Being aware of the topic of the unit will be useful in reading academic English		Yes	No	Unsure
Lecturers	Count	13	1	1
	%	86.7%	6.7%	6.7%
Students	Count	17	1	2
	%	85.0%	5.0%	10.0%

4. I will use the content of the unit for other purposes than reading academic English		Yes	No	Unsure	Missing
Lecturers	Count	4	3	7	1
	%	26.7%	20.0%	46.7%	6.7%
Students	Count	2	4	14	0
	%	10.0%	20.0%	70.0%	0%

5. I would benefit from learning more on this topic		Yes	No	Unsure	Missing
Lecturers	Count	3	1	10	1
	%	20.0%	6.7%	66.7%	6.7%
Students	Count	8	1	11	0
	%	40.0%	5.0%	55.0%	0%

Participants who answered yes to 4 and/or 5 they were asked to explain their choice.

4. I will use the content of the unit for other purposes than reading academic English			
Coding		**Total**	
		LL	**SS**
1. Writing in English	Count	1	0
	%	6.7%	0%
2. Writing	Count	3	0
	%	20.0%	0%
3. Speaking	Count	1	0
	%	6.7%	0%
4. Translating	Count	1	0
	%	6.7%	0%

5. I would benefit from learning more on this topic			
Coding		**Total**	
		LL	**SS**
1. Help interpret texts better	Count	0	6
	%	0%	30.0%
2. More practise needed	Count	2	1
	%	13.3%	5.0%
3. Difficult topic	Count	0	2
	%	0%	10.0%
4. New topic	Count	1	0
	%	6.7%	0%

Participants were invited to state what topic strategies/knowledge they might use next time they read.

6.What I have learnt from this unit that I will use next time I read...			
Coding		**Total**	
		LL	**SS**
1. Noticing noun chains	Count	5	6
	%	33.3%	30.0%
2. Decoding noun chains	Count	3	2
	%	20.0%	10.0%
3. Understanding noun chains better	Count	2	11
	%	13.3%	55.0%
4. Translating noun chains	Count	3	2
	%	20.0%	10.0%
5. Differences between Portuguese and English	Count	0	3
	%	0%	15.0%

Unit 6

Subjects' perception of five statements (1-5):

1. The topic of the unit was new to me				
		Yes	**No**	**Unsure**
Lecturers	Count	12	0	3
	%	80.0%	0%	20.0%
Students	Count	16	3	1
	%	80.0%	15.0%	5.0%

2. I think I have learnt something useful in this unit				
		Yes	**No**	**Unsure**
Lecturers	Count	12	0	3
	%	80.0%	0%	20.0%
Students	Count	15	0	5
	%	75.0%	0%	25.0%

3. Being aware of the topic of the unit will be useful in reading academic English				
		Yes	**No**	**Unsure**
Lecturers	Count	10	2	3
	%	66.7%	13.3%	20.0%
Students	Count	11	1	8
	%	55.0%	5.0%	40.0%

4. I will use the content of the unit for other purposes than reading academic English					
		Yes	**No**	**Unsure**	**Missing**
Lecturers	Count	5	5	5	0
	%	33.3%	33.3%	33.3%	0%
Students	Count	5	1	13	1
	%	25.0%	5.0%	65.0%	5.0%

5. I would benefit from learning more on this topic					
		Yes	**No**	**Unsure**	**Missing**
Lecturers	Count	4	3	8	0
	%	26.7%	20.0%	53.3%	0%
Students	Count	7	3	9	1
	%	35.0%	15.0%	45.0%	5.0%

Participants who answered yes to 4 and/or 5 they were asked to explain their choice.

4. I will use the content of the unit for other purposes than reading academic English			
Coding		**Total**	
		LL	**SS**
1. Reading texts	Count	0	4
	%	0%	20.0%
2. Reading in other languages than English	Count	1	0
	%	6.7%	0%
3. Writing in English	Count	1	1
	%	6.7%	5.0%
4. Writing	Count	3	0
	%	20.0%	0%

5. I would benefit from learning more on this topic			
Coding		**Total**	
		LL	**SS**
1. Help interpret texts better	Count	1	5
	%	6.7%	25.0%
2. More practise needed	Count	1	0
	%	6.7%	0%
3. Help in writing	Count	1	2
	%	6.7%	10.0%

Participants were invited to state what topic strategies/knowledge they might use next time they read.

6.What I have learnt from this unit that I will use next time I read...			
Coding		**Total**	
		LL	**SS**
1. Noticing nominal style	Count	1	3
	%	6.7%	15.0%
2. Difference between nominal and verbal style	Count	3	3
	%	20.0%	15.0%
3. Understanding texts better	Count	3	8
	%	20.0%	40.0%
4. Concise way of expressing ideas	Count	3	3
	%	20.0%	15.0%
5. Reading academic texts is more difficult than reading other texts	Count	1	2
	%	6.7%	10.0%
6. Translating	Count	1	0
	%	6.7%	0%
7. Analysing verbs and tense	Count	0	1
	%	0%	5.0%

Unit 7

Subjects' perception of five statements (1-5):

1. The topic of the unit was new to me		Yes	No	Unsure
Lecturers	Count	10	2	3
	%	66.7%	13.3%	20.0%
Students	Count	16	2	2
	%	80.0%	10.0%	10.0%

2. I think I have learnt something useful in this unit		Yes	No	Unsure
Lecturers	Count	14	0	1
	%	93.3%	0%	6.7%
Students	Count	19	0	1
	%	95.0%	0%	5.0%

3. Being aware of the topic of the unit will be useful in reading academic English		Yes	No	Unsure	Missing
Lecturers	Count	9	1	5	0
	%	60.0%	6.7%	33.3%	0%
Students	Count	13	1	5	1
	%	65.0%	5.0%	25.0%	5.0%

4. I will use the content of the unit for other purposes than reading academic English		Yes	No	Unsure
Lecturers	Count	9	2	4
	%	60.0%	13.3%	26.7%
Students	Count	3	4	13
	%	15.0%	20.0%	65.0%

5. I would benefit from learning more on this topic		Yes	No	Unsure	Missing
Lecturers	Count	1	3	9	2
	%	6.7%	20.0%	60.0%	13.3%
Students	Count	2	3	15	0
	%	10.0%	15.0%	75.0%	0%

Participants who answered yes to 4 and/or 5 they were asked to explain their choice.

4. I will use the content of the unit for other purposes than reading academic English			
Coding		**Total**	
		LL	**SS**
1. Reading texts	Count	1	1
	%	6.7%	5.0%
2. Writing research articles	Count	3	0
	%	20.0%	0%
3. Writing in English	Count	2	1
	%	13.3%	5.0%
4. Writing	Count	1	0
	%	6.7%	0%
5. Writing academic English	Count	1	0
	%	6.7%	0%
6. Writing abstracts	Count	1	0
	%	6.7%	0%

5. I would benefit from learning more on this topic			
Coding		**Total**	
		LL	**SS**
1. Help interpret texts better	Count	0	2
	%	0%	10.0%
2. Help in writing	Count	1	0
	%	6.7%	0%

Participants were invited to state what topic strategies/knowledge they might use next time they read.

6.What I have learnt from this unit that I will use next time I read...			
Coding		**Total**	
		LL	**SS**
1. Writer's commitment / attitude	Count	10	8
	%	66.7%	40.0%
2. Scientific articles	Count	1	1
	%	6.7%	5.0%
3. Politeness	Count	3	1
	%	20.0%	5.0%
4. Understanding texts better	Count	0	5
	%	0%	25.0%
5. Differences between textbooks and research articles	Count	0	1
	%	0%	5.0%
6. Being able to contradict a point of view	Count	0	1
	%	0%	5.0%
7. Useful for: degree research project	Count	0	1
	%	0%	5.0%
8. Scanning textbooks or articles	Count	0	2
	%	0%	10.0%
9. Cultural differences	Count	0	1
	%	0%	5.0%
10. Guiding readers	Count	0	1
	%	0%	5.0%

Unit 8

Subjects' perception of five statements (1-5):

1. The topic of the unit was new to me				
		Yes	No	Unsure
Lecturers	Count	10	2	3
	%	66.7%	13.3%	20.0%
Students	Count	12	5	3
	%	60.0%	25.0%	15.0%

2. I think I have learnt something useful in this unit				
		Yes	No	Unsure
Lecturers	Count	14	0	1
	%	93.3%	0%	6.7%
Students	Count	19	0	1
	%	95.0%	0%	5.0%

3. Being aware of the topic of the unit will be useful in reading academic English				
		Yes	No	Unsure
Lecturers	Count	12	1	2
	%	80.0%	6.7%	13.3%
Students	Count	14	1	5
	%	70.0%	5.0%	25.0%

4. I will use the content of the unit for other purposes than reading academic English				
		Yes	No	Unsure
Lecturers	Count	8	3	4
	%	53.3%	20.0%	26.7%
Students	Count	4	2	14
	%	20.0%	10.0%	70.0%

5. I would benefit from learning more on this topic					
		Yes	No	Unsure	Missing
Lecturers	Count	2	3	9	1
	%	13.3%	20.0%	60.0%	6.77%
Students	Count	4	1	15	0
	%	20.0%	5.0%	75.0%	0%

Participants who answered yes to 4 and/or 5 they were asked to explain their choice.

4. I will use the content of the unit for other purposes than reading academic English			
Coding		**Total**	
		LL	**SS**
1. Reading non-academic texts	Count	1	0
	%	6.7%	0%
2. Reading in other languages than English	Count	1	0
	%	6.7%	0%
3. Writing in English	Count	3	0
	%	20.0%	0%
4. Writing	Count	7	0
	%	46.7%	0%

5. I would benefit from learning more on this topic			
Coding		**Total**	
		LL	**SS**
1. Help understand writer's commitment	Count	1	2
	%	6.7%	10.0%
2. More practise needed	Count	1	1
	%	6.7%	5.0%
3. Help in writing	Count	0	1
	%	0%	5.0%

Participants were invited to state what topic strategies/knowledge they might use next time they read.

6.What I have learnt from this unit that I will use next time I read...			
Coding		**Total**	
		LL	**SS**
1. Noticing reporting verbs	Count	2	2
	%	13.3%	10.0%
2. Understanding writer's point of view 7 commitment	Count	6	10
	%	40.0%	50.0%
3. Understanding texts better	Count	4	5
	%	26.7%	25.0%
4. Help select other texts/ authors to read	Count	1	4
	%	6.7%	20.0%
5. Help read for future work	Count	0	5
	%	0%	25.0%

Unit 9

Subjects' perception of five statements (1-5):

1. The topic of the unit was new to me				
		Yes	No	Unsure
Lecturers	Count	8	5	2
	%	53.3%	33.3%	13.3%
Students	Count	13	2	5
	%	65.0%	10.0%	25.0%

2. I think I have learnt something useful in this unit				
		Yes	No	Unsure
Lecturers	Count	12	0	3
	%	80.0%	0%	20.0%
Students	Count	19	0	1
	%	95.0%	0%	5.0%

3. Being aware of the topic of the unit will be useful in reading academic English				
		Yes	No	Unsure
Lecturers	Count	10	0	5
	%	66.7%	0%	33.3%
Students	Count	14	0	6
	%	70.0%	0%	30.0%

4. I will use the content of the unit for other purposes than reading academic English					
		Yes	No	Unsure	Missing
Lecturers	Count	6	4	4	1
	%	40.0%	26.7%	26.7%	6.7%
Students	Count	4	3	12	1
	%	20.0%	15.0%	60.0%	5.0%

5. I would benefit from learning more on this topic					
		Yes	No	Unsure	Missing
Lecturers	Count	3	3	8	1
	%	20.0%	20.0%	53.3%	6.7%
Students	Count	3	2	14	1
	%	15.0%	10.0%	70.0%	5.0%

Participants who answered yes to 4 and/or 5 were asked to explain their choice.

4. I will use the content of the unit for other purposes than reading academic English			
Coding		Total	
		LL	SS
1. Reading texts	Count	2	4
	%	13.3%	20.0%
2. Reading in other languages than English	Count	2	0
	%	13.3%	0%
3. Writing in English	Count	2	0
	%	13.35	0%
4. Writing	Count	3	0
	%	20.0%	0%

5. I would benefit from learning more on this topic			
Coding		Total	
		LL	SS
1. Saves reading time	Count	0	1
	%	0%	5.0%
2. More exercises needed	Count	1	1
	%	6.7%	5.0%
3. Help in writing	Count	1	0
	%	6.7%	0%
4. Useful	Count	1	1
	%	6.7%	5.0%

Participants were invited to state what topic strategies/knowledge they might use next time they read.

Coding		Total	
		LL	SS
1. Noticing topic sentences	Count	8	9
	%	53.3%	45.0%
2. Noticing thesis statement	Count	8	1
	%	53.3%	5.0%
3. Understanding texts better	Count	3	7
	%	20.0%	35.0%
4. Getting the gist of the text	Count	7	8
	%	46.7%	40.0%
5. Skimming texts	Count	4	3
	%	26.7%	15.0%
6. Scanning texts	Count	2	4
	%	13.3%	20.0%
7. Summarising texts	Count	1	1
	%	6.7%	5.0%
8. Deciding whether or not to read the text	Count	0	1
	%	0%	5.0%

APPENDIX 20

Results: Post-course questionnaire (April 2001)

1. **Complete the list below and rate your improvement by ticking (✓) <u>one box</u> for <u>each item</u>.**

		1. My reading speed in English				
		did not improve	improved a bit	improved a lot	do not know	Total
Lecturers	Count	1	9	3	2	15
	%	6.7%	60.0%	20.0%	13.3%	100.0%
Students	Count	2	8	8	2	20
	%	10.0%	40.0%	40.0%	10.0%	100.0%
Total	Count	3	17	11	4	35
	%	8.6%	48.6%	31.4%	11.4%	100.0%

		2. My vocabulary				
		did not improve	improved a bit	improved a lot	do not know	Total
Lecturers	Count	0	10	4	1	15
	%	0%	66.7%	26.7%	6.7%	100.0%
Students	Count	0	7	9	4	20
	%	0%	35.0%	45.0%	20.0%	100.0%
Total	Count	0	17	13	5	35
	%	0%	48.6%	37.1%	14.3%	100.0%

		3. My ability to use text structure or organisation				
		did not improve	improved a bit	improved a lot	do not know	Total
Lecturers	Count	0	2	13	0	15
	%	0%	13.3%	86.7%	0%	100.0%
Students	Count	0	4	16	0	20
	%	0%	20.0%	80.0%	0%	100.0%
Total	Count	0	6	29	0	35
	%	0%	17.1%	82.9%	0%	100.0%

		4. Other			
		improved a bit	improved a lot	did not answer	Total
Lecturers	Count	2	2	11	15
	%	13.3%	13.3%	73.3%	100.0%
Students	Count	1	5	14	20
	%	5.0%	25.0%	70.0%	100.0%
Total	Count	3	7	25	35
	%	8.6%	20.0%	71.4%	100.0%

		5. Other			Total
		improved a bit	improved a lot	did not answer	
Lecturers	Count	1	1	13	15
	%	6.7%	6.7%	86.7%	100.0%
Students	Count	0	0	20	20
	%	0%	0%	100.0%	100.0%
Total	Count	1	1	33	35
	%	2.9%	2.9%	94.3%	100.0%

2. How you rate your reading in English after the course. Please tick (✓) <u>one</u> box.

		I expect to read...	before the course			Total
		fewer texts	same no. of texts	more texts	do not know	
Lecturers	Count	0	7	7	1	15
	%	0%	46.7%	46.7%	6.7%	100.0%
Students	Count	0	1	16	3	20
	%	0%	5.0%	80%	15.0%	100.0%
Total	Count	0	8	23	4	35
	%	0%	22.9%	65.7%	11.4%	100.0%

If you chose answer 2.3 answer question 3 below.

3. I expect to read more texts in English than before the course because... Please tick (✓) <u>one or more</u> box.

3.1 'Tuned in' to English		
Lecturers	Count	3
	%	20.0%
Students	Count	8
	%	40.0%
Total	Count	11
	%	31.4%

3.2 I felt more encouraged		
Lecturers	Count	3
	%	20.0%
Students	Count	5
	%	25.0%
Total	Count	8
	%	22.9%

3.3 I felt more motivated		
Lecturers	Count	4
	%	26.7%
Students	Count	8
	%	40.0%
Total	Count	12
	%	34.3%

3.4 I felt more confident		
Lecturers	Count	5
	%	33.3%
Students	Count	10
	%	50.0%
Total	Count	15
	%	42.9%

3.5 Other		
Lecturers	Count	2
	%	13.3%
Students	Count	0
	%	0%
Total	Count	2
	%	5.7%

4. How do you rate the usefulness of the course topics for reading? Tick (✓) <u>one box</u> for <u>each item</u>.

Unit 1		Being aware of the structure and organisation of the text...					
		is not useful	is not very useful	is useful	is very useful	unsure	Total
Lecturers	Count	0	1	5	9	0	15
	%	0%	6.7%	33.3%	60.0%	0%	100.0%
Students	Count	0	1	9	10	0	20
	%	0%	5.0%	45.0%	50.0%	0%	100.0%
Total	Count	0	2	14	19	0	35
	%	0%	5.7%	40.0%%	54.3%	0%	100.0%

Unit 2		Being aware of reviews, previews and action markers...					
		is not useful	is not very useful	is useful	is very useful	unsure	Total
Lecturers	Count	0	1	5	8	1	15
	%	0%	6.7%	33.3%	53.3%	6.7%	100.0%
Students	Count	0	0	13	6	1	20
	%	0%	0%	65.0%	30.0%	5.0%	100.0%
Total	Count	0	1	18	14	2	35
	%	0%	2.9%	51.4%	40.0%	5.7%	100.0%

Unit 3		Being aware of the use of connectors...					
		is not useful	is not very useful	is useful	is very useful	unsure	Total
Lecturers	Count	0	1	5	9	0	15
	%	0%	6.7%	33.3%	60.0%	0%	100.0%
Students	Count	0	0	15	4	1	20
	%	0%	0%	75.0%	20.0%	5.0%	100.0%
Total	Count	0	1	20	13	1	35
	%	0%	2.9%	57.1%	37.1%	2.9%	100.0%

Unit 4		Being aware of discourse structuring words...					
		is not useful	is not very useful	is useful	is very useful	unsure	Total
Lecturers	Count	0	2	4	9	0	15
	%	0%	13.3%	26.7%	60.0%	0%	100.0%
Students	Count	0	0	9	8	3	20
	%	0%	0%	45.0%	40.0%	15.0%	100.0%
Total	Count	0	2	13	17	3	35
	%	0%	5.7%	37.1%	48.6%	8.6%	100.0%

Unit 5		Being aware of noun chains...					
		is not useful	is not very useful	is useful	is very useful	unsure	Total
Lecturers	Count	0	1	7	7	0	15
	%	0%	6.7%	46.7%	46.7%	0%	100.0%
Students	Count	0	1	11	7	1	20
	%	0%	5.0%	55.0%	35.0%	5.0%	100.0%
Total	Count	0	2	18	14	1	35
	%	0%	5.7%	51.4%	40.0%	2.9%	100.0%

Unit 6		Being aware of the use of nominalisations...					
		is not useful	is not very useful	is useful	is very useful	unsure	Total
Lecturers	Count	0	1	9	5	0	15
	%	0%	6.7%	60.0%	33.3%	0%	100.0%
Students	Count	0	1	10	5	4	20
	%	0%	5.0%	50.0%	25.0%	20.0%	100.0%
Total	Count	0	2	19	10	4	35
	%	0%	5.7%	54.3%	28.6%	11.4%	100.0%

Unit 7		Being aware of hedging...					Total
		is not useful	is not very useful	is useful	is very useful	unsure	
Lecturers	Count	0	1	8	6	0	15
	%	0%	6.7%	53.3%	40%	0%	100.0%
Students	Count	0	2	9	6	3	20
	%	0%	10.0%	45.0%	30%	15.0%	100.0%
Total	Count	0	3	17	12	3	35
	%	0%	8.6%	48.6%	34.3%	8.6%	100.0%

Unit 8		Being aware of reporting verbs ...					Total
		is not useful	is not very useful	is useful	is very useful	unsure	
Lecturers	Count	0	1	7	7	0	15
	%	0%	6.7%	46.7%	46.7%	0%	100.0%
Students	Count	0	1	10	7	2	20
	%	0%	5.0%	50.0%	35.0%	10.0%	100.0%
Total	Count	0	2	17	14	2	35
	%	0%	5.7%	48.6%	40.0%	5.7%	100.0%

Unit 9		Being aware of thesis statement and topic sentences...					Total
		is not useful	is not very useful	is useful	is very useful	unsure	
Lecturers	Count	0	1	5	9	0	15
	%	0%	6.7%	33.3%	60.0%	0%	100.0%
Students	Count	0	0	9	11	0	20
	%	0%	0%	45.0%	55.0%	0%	100.0%
Total	Count	0	1	14	20	0	35
	%	0%	2.9%	40.0%	57.1%	0%	100.0%

5. What I found most useful in the course was…

Most useful in the course		Lecturers	Students	Total
Unit 1 (structure and organisation of texts)	Count	8	7	15
	%	53.3%	35.0%	42.9%
Unit 2 (metatext)	Count	1	1	2
	%	6.7%	5.0%	5.7%
Unit 6 (nominal style)	Count	1	0	1
	%	6.7%	0%	2.9%
Unit 7 (hedging)	Count	1	0	1
	%	6.7%	0%	2.9%
Unit 8 (reporting verbs)	Count	1	2	3
	%	6.7%	10.0%	8.6%
Unit 9 (thesis statement and topic sentences)	Count	3	4	7
	%	20.0%	20.0%	20.0%
Did not answer	Count	1	0	1
	%	6.7%	0%	2.9%
Everything	Count	2	2	4
	%	13.3%	10.0%	11.4%
Contact with English	Count	1	4	5
	%	6.7%	20.0%	14.3%
Contact with academic English	Count	0	1	1
	%	0%	5.0%	2.9%
Reading texts in English	Count	2	2	4
	%	13.3%	10.0%	11.4%
Speaking in English	Count	1	1	2
	%	6.7%	5.0%	5.7%
Listening	Count	0	1	1
	%	0%	5.0%	2.9%
Awareness things did not know before	Count	1	2	3
	%	6.7%	10.0%	8.6%
Awareness of language nuances	Count	1	0	1
	%	6.7%	0%	2.9%
Topics different from usual syllabus	Count	0	1	1
	%	0%	5.0%	2.9%
Useful for degree project report	Count	0	1	1
	%	0%	5.0%	2.9%
Read only what you need	Count	1	1	2
	%	6.7%	5.0%	5.7%
Lesson structure	Count	0	1	1
	%	0%	5.0%	2.9%
Find information more easily	Count	0	4	4
	%	0%	20.0%	11.4%
Structure of English	Count	0	1	1
	%	0%	5.0%	2.9%
Better understanding of texts	Count	1	5	6
	%	6.7%	25.0%	17.1%
English vs. Portuguese writing	Count	1	0	1
	%	6.7%	0%	2.9%

6. What I found the least useful in the course was…

Least useful in the course		Lecturers	Students	Total
4 (discourse structuring words)	Count	0	1	1
	%	0%	5.0%	2.9%
6 (nominal style)	Count	3	1	4
	%	20.0%	5.0%	11.4%
7 (hedging)	Count	1	1	2
	%	6.7%	5.0%	5.7%
Everything was useful	Count	4	4	8
	%	26.7%	20.0%	22.9%
Did not answer	Count	2	6	8
	%	13.3%	30.0%	22.9%
Texts of different fields	Count	2	0	2
	%	13.3%	0%	5.7%
Long texts	Count	1	0	1
	%	6.7%	0%	2.9%
Homework	Count	1	0	1
	%	6.7%	0%	2.9%
Some topics (not mentioned which ones)	Count	0	2	2
	%	0%	10.0%	5.7%
Lack of time	Count	0	2	2
	%	0%	10.0%	5.7%
Many tests - tiredness	Count	0	1	1
	%	0%	5.0%	2.9%
Cannot remember	Count	0	1	1
	%	0%	5.0%	2.9%
I don't know	Count	0	1	1
	%	0%	5.0%	2.9%

7. Is there anything else of relevance you would like to add?

Comments		Lecturers	Students	Total
I did not study enough	Count	2	0	2
	%	13.3%	0%	5.7%
I had a poor command of English	Count	1	0	1
	%	6.7%	0%	2.9%
More time needed for practice	Count	1	1	2
	%	6.7%	5.0%	5.7%
More courses	Count	1	4	5
	%	6.7%	20.0%	14.3%
Other courses with different topics (e.g. spoken academic English)	Count	0	3	3
	%	0%	15.0%	8.6%
Vocabulary more practice needed	Count	0	1	1
	%	0%	5.0%	2.9%
I liked topics different from usual syllabus	Count	0	1	1
	%	0%	5.0%	2.9%
Interaction with students	Count	0	1	1
	%	0%	5.0%	2.9%
I felt useful	Count	0	1	1
	%	0%	5.0%	2.9%
Too much for a short time	Count	0	1	1
	%	0%	5.0%	2.9%
Timed tests	Count	0	1	1
	%	0%	5.0%	2.9%
Reading texts of different fields (heavy)	Count	0	1	1
	%	0%	5.0%	2.9%
I would like class debates (speaking)	Count	0	1	1
	%	0%	5.0%	2.9%
Specific vocabulary	Count	1	0	1
	%	6.7%	0%	2.9%

APPENDIX 21

Results: While-reading questionnaires

Unit 1

While I was reading I paid attention to...

		...the structure and organisation of the text (topic of Unit 1)			
		Yes	Unsure	No	No answer
Lecturers	Count	5	1	4	5
	%	33.3%	6.7%	26.7%	33.3%
Students	Count	8	4	2	6
	%	40.0%	20.0%	10.0%	30.0%

Unit 2

While I was reading I paid attention to...

		the structure and organisation of the text (topic of Unit 1)			
		Yes	Unsure	No	No answer
Lecturers	Count	8	0	0	7
	%	53.3%	0%	0%	46.7%
Students	Count	7	4	3	6
	%	35.0%	20.0%	15.0%	30.0%

While I was reading I paid attention to...

		reviews, previews and action markers. (topic of Unit 2)			
		Yes	Unsure	No	No answer
Lecturers	Count	5	2	1	7
	%	33.3%	13.3%	6.7%	46.7%
Students	Count	10	3	1	6
	%	50.0%	15.0%	5.0%	30.0%

Unit 3

While I was reading I paid attention to...

		the structure and organisation of the text (topic of Unit 1)			
		Yes	Unsure	No	No answer
Lecturers	Count	6	0	1	8
	%	40.0%	0%	6.7%	53.3%
Students	Count	9	3	2	6
	%	45.0%	5.0%	10.0%	30.0%

While I was reading I paid attention to...

		reviews, previews and action markers. (topic of Unit 2)			
		Yes	Unsure	No	No answer
Lecturers	Count	4	1	2	8
	%	26.7%	6.7%	13.3%	53.3%
Students	Count	11	1	2	6
	%	55.0%	5.0%	10.0%	30.0%

While I was reading I paid attention to...

the use of connectors. (topic of Unit 3)					
		Yes	Unsure	No	No answer
Lecturers	Count	6	0	1	8
	%	40.0%	0%	6.7%	53.3%
Students	Count	9	4	1	6
	%	45.0%	20.0%	5.0%	30.0%

Unit 4

While I was reading I paid attention to...

the structure and organisation of the text (topic of Unit 1)					
		Yes	Unsure	No	No answer
Lecturers	Count	6	0	0	9
	%	40.0%	0%	0%	60.0%
Students	Count	7	5	2	6
	%	35.0%	25.0%	10.0%	30.0%

While I was reading I paid attention to...

reviews, previews and action markers. (topic of Unit 2)					
		Yes	Unsure	No	No answer
Lecturers	Count	4	1	1	9
	%	26.7%	6.7%	6.7%	60.0%
Students	Count	8	6	0	6
	%	40.0%	30.0%	0%	30.0%

While I was reading I paid attention to...

the use of connectors. (topic of Unit 3)					
		Yes	Unsure	No	No answer
Lecturers	Count	5	0	1	9
	%	33.3%	0%	6.7%	60.0%
Students	Count	9	5	0	6
	%	45.0%	25.0%	0%	30.0%

While I was reading I paid attention to...

discourse structuring words. (topic of Unit 4)					
		Yes	Unsure	No	No answer
Lecturers	Count	3	2	1	9
	%	20.0%	13.3%	6.7%	60.0%
Students	Count	8	6	0	6
	%	40.0%	30.0%	0%	30.0%

Unit 5

While I was reading I paid attention to...

		the structure and organisation of the text (topic of Unit 1)			
		Yes	**Unsure**	**No**	**No answer**
Lecturers	Count	4	0	0	11
	%	26.7%	0%	0%	73.3%
Students	Count	6	4	2	8
	%	30.0%	20.0%	10.0%	40.0%

While I was reading I paid attention to...

		reviews, previews and action markers. (topic of Unit 2)			
		Yes	**Unsure**	**No**	**No answer**
Lecturers	Count	3	0	1	11
	%	20.0%	0%	6.7%	73.3%
Students	Count	6	3	3	8
	%	30.0%	15.0%	15.0%	40.0%

While I was reading I paid attention to...

		the use of connectors. (topic of Unit 3)			
		Yes	**Unsure**	**No**	**No answer**
Lecturers	Count	3	0	1	11
	%	20.0%	0%	6.7%	73.3%
Students	Count	8	2	2	8
	%	40.0%	10.0%	10.0%	40.0%

While I was reading I paid attention to...

		discourse structuring words. (topic of Unit 4)			
		Yes	**Unsure**	**No**	**No answer**
Lecturers	Count	3	0	1	11
	%	20.0%	0%	6.7%	73.3%
Students	Count	4	7	1	8
	%	20.0%	35.0%	5.0%	40.0%

While I was reading I paid attention to...

		noun chains. (topic of Unit 5)			
		Yes	**Unsure**	**No**	**No answer**
Lecturers	Count	3	0	1	11
	%	20.0%	0%	6.7%	73.3%
Students	Count	7	5	0	8
	%	35.0%	25.0%	0%	40.0%

Unit 6

While I was reading I paid attention to...

		the structure and organisation of the text (topic of Unit 1)			
		Yes	**Unsure**	**No**	**No answer**
Lecturers	Count	4	0	0	11
	%	26.7%	0%	0%	73.3%
Students	Count	4	1	5	10
	%	20.0%	5.0%	25.0%	50.0%

While I was reading I paid attention to...

		reviews, previews and action markers. (topic of Unit 2)			
		Yes	**Unsure**	**No**	**No answer**
Lecturers	Count	3	0	1	11
	%	20.0%	0%	6.7%	73.3%
Students	Count	5	4	1	10
	%	25.0%	20.0%	5.0%	50.0%

While I was reading I paid attention to...

		the use of connectors. (topic of Unit 3)			
		Yes	**Unsure**	**No**	**No answer**
Lecturers	Count	3	0	1	11
	%	20.0%	0%	6.7%	73.3%
Students	Count	6	3	1	10
	%	30.0%	15.0%	5.0%	50.0%

While I was reading I paid attention to...

		discourse structuring words. (topic of Unit 4)			
		Yes	**Unsure**	**No**	**No answer**
Lecturers	Count	3	0	1	11
	%	20.0%	0%	6.7%	73.3%
Students	Count	2	6	2	10
	%	10.0%	30.0%	10.0%	50.0%

While I was reading I paid attention to...

		noun chains. (topic of Unit 5)			
		Yes	**Unsure**	**No**	**No answer**
Lecturers	Count	3	0	1	11
	%	20.0%	0%	6.7%	73.3%
Students	Count	3	6	1	10
	%	15.0%	30.0%	5.0%	50.0%

While I was reading I paid attention to...

		the use of nominalisations. (topic of Unit 6)			
		Yes	**Unsure**	**No**	**No answer**
Lecturers	Count	2	0	2	11
	%	13.3%	0%	13.3%	73.3%
Students	Count	4	5	1	10
	%	20.0%	25.0%	5.0%	50.0%

Unit 7

While I was reading I paid attention to...

		the structure and organisation of the text (topic of Unit 1)			
		Yes	Unsure	No	No answer
Lecturers	Count	3	0	0	12
	%	20.0%	0%	0%	80.0%
Students	Count	8	0	3	9
	%	40.0%	0%	15.0%	45.0%

While I was reading I paid attention to...

		reviews, previews and action markers. (topic of Unit 2)			
		Yes	Unsure	No	No answer
Lecturers	Count	2	0	1	12
	%	13.3%	0%	6.7%	80.0%
Students	Count	7	1	3	9
	%	35.0%	5.0%	15.0%	45.0%

While I was reading I paid attention to...

		the use of connectors. (topic of Unit 3)			
		Yes	Unsure	No	No answer
Lecturers	Count	2	0	1	12
	%	13.3%	0%	6.7%	80.0%
Students	Count	7	3	1	9
	%	35.0%	15.0%	5.0%	45.0%

While I was reading I paid attention to...

		discourse structuring words. (topic of Unit 4)			
		Yes	Unsure	No	No answer
Lecturers	Count	2	0	1	12
	%	13.3%	0%	6.7%	80.0%
Students	Count	5	5	1	9
	%	25.0%	25.0%	5.0%	45.0%

While I was reading I paid attention to...

		noun chains. (topic of Unit 5)			
		Yes	Unsure	No	No answer
Lecturers	Count	2	0	1	12
	%	13.3%	0%	6.7%	80.0%
Students	Count	3	7	1	9
	%	15.0%	35.0%	5.0%	45.0%

While I was reading I paid attention to...

		the use of nominalisations. (topic of Unit 6)			
		Yes	Unsure	No	No answer
Lecturers	Count	1	0	2	12
	%	6.7%	0%	13.3%	80.0%
Students	Count	3	4	4	9
	%	15.0%	20.0%	20.0%	45.0%

While I was reading I paid attention to...

		hedging. (topic of Unit 7)			
		Yes	Unsure	No	No answer
Lecturers	Count	2	0	1	12
	%	13.3%	0%	6.7%	80.0%
Students	Count	7	2	2	9
	%	35.0%	10.0%	10.0%	45.0%

Unit 8

While I was reading I paid attention to...

		the structure and organisation of the text (topic of Unit 1)			
		Yes	Unsure	No	No answer
Lecturers	Count	2	0	0	13
	%	13.3%	0%	0%	86.7%
Students	Count	8	1	2	9
	%	40.0%	5.0%	10.0%	45.0%

While I was reading I paid attention to...

		reviews, previews and action markers. (topic of Unit 2)			
		Yes	Unsure	No	No answer
Lecturers	Count	1	0	1	13
	%	6.7%	0%	6.7%	86.7%
Students	Count	5	4	2	9
	%	25.0%	20.0%	10.0%	45.0%

While I was reading I paid attention to...

		the use of connectors. (topic of Unit 3)			
		Yes	Unsure	No	No answer
Lecturers	Count	1	0	1	13
	%	6.7%	0%	6.7%	86.7%
Students	Count	6	4	1	9
	%	30.0%	20.0%	5.0%	45.0%

While I was reading I paid attention to...

		discourse structuring words. (topic of Unit 4)			
		Yes	Unsure	No	No answer
Lecturers	Count	1	0	1	13
	%	6.7%	0%	6.7%	86.7%
Students	Count	4	7	0	9
	%	20.0%	35.0%	0%	45.0%

While I was reading I paid attention to...

		noun chains. (topic of Unit 5)			
		Yes	Unsure	No	No answer
Lecturers	Count	1	0	1	13
	%	6.7%	0%	6.7%	86.7%
Students	Count	3	8	0	9
	%	15.0%	40.0%	0%	45.0%

While I was reading I paid attention to...

the use of nominalisations. (topic of Unit 6)		Yes	Unsure	No	No answer
Lecturers	Count	1	0	1	13
	%	6.7%	0%	6.7%	86.7%
Students	Count	4	5	2	9
	%	20.0%	25.0%	10.0%	45.0%

While I was reading I paid attention to...

hedging. (topic of Unit 7)		Yes	Unsure	No	No answer
Lecturers	Count	1	0	1	13
	%	6.7%	0%	6.7%	86.7%
Students	Count	3	7	1	9
	%	15.0%	35.0%	5.0%	45.0%

While I was reading I paid attention to...

reporting verbs. (topic of Unit 8)		Yes	Unsure	No	No answer
Lecturers	Count	1	0	1	13
	%	6.7%	0%	6.7%	86.7%
Students	Count	8	3	0	9
	%	40.0%	15.0%	0%	45.0%

Unit 9

While I was reading I paid attention to...

the structure and organisation of the text (topic of Unit 1)		Yes	Unsure	No	No answer
Lecturers	Count	2	0	0	13
	%	13.3%	0%	0%	86.7%
Students	Count	7	2	2	9
	%	35.0%	10.0%	10.0%	45.0%

While I was reading I paid attention to...

reviews, previews and action markers. (topic of Unit 2)		Yes	Unsure	No	No answer
Lecturers	Count	1	0	1	13
	%	6.7%	0%	6.7%	86.7%
Students	Count	5	6	0	9
	%	25.0%	30.0%	0%	45.0%

While I was reading I paid attention to...

the use of connectors. (topic of Unit 3)		Yes	Unsure	No	No answer
Lecturers	Count	1	0	1	13
	%	6.7%	0%	6.7%	86.7%
Students	Count	7	4	0	9
	%	35.0%	20.0%	0%	45.0%

While I was reading I paid attention to...

		discourse structuring words. (topic of Unit 4)			
		Yes	Unsure	No	No answer
Lecturers	Count	1	0	1	13
	%	6.7%	0%	6.7%	86.7%
Students	Count	6	5	0	9
	%	30.0%	25.0%	0%	45.0%

While I was reading I paid attention to...

		noun chains. (topic of Unit 5)			
		Yes	Unsure	No	No answer
Lecturers	Count	1	0	1	13
	%	6.7%	0%	6.7%	86.7%
Students	Count	4	6	1	9
	%	20.0%	30.0%	5.0%	45.0%

While I was reading I paid attention to...

		the use of nominalisations. (topic of Unit 6)			
		Yes	Unsure	No	No answer
Lecturers	Count	1	0	1	13
	%	6.7%	0%	6.7%	86.7%
Students	Count	5	6	0	9
	%	25.0%	30.0%	0%	45.0%

While I was reading I paid attention to...

		hedging. (topic of Unit 7)			
		Yes	Unsure	No	No answer
Lecturers	Count	1	0	1	13
	%	6.7%	0%	6.7%	86.7%
Students	Count	3	8	0	9
	%	15.0%	40.0%	0%	45.0%

While I was reading I paid attention to...

		reporting verbs. (topic of Unit 8)			
		Yes	Unsure	No	No answer
Lecturers	Count	1	0	1	13
	%	6.7%	0%	6.7%	86.7%
Students	Count	7	3	1	9
	%	35.0%	15.0%	5.0%	45.0%

While I was reading I paid attention to...

		topic sentences. (topic of Unit 9)			
		Yes	Unsure	No	No answer
Lecturers	Count	2	0	0	13
	%	13.3%	0%	0%	86.7%
Students	Count	8	3	0	9
	%	40.0%	15.0%	0%	45.0%

APPENDIX 22

A sample of tasks

1. Comparing genres within the same discipline:

Task 1: genres - Comparing two different genres dealing with the same topic – a research article and a popularization – written by the same researcher(s). Discussion of how genres differ (e.g. audience, purpose, view of science). (SS: pairs)

Research article:
Glenn, E.P., J.W. O'Leary, M.C. Watson, T.L. Thompson and R.O Kuehl. 1991. *Salicornia bigelo viii Torr.:* An oilseed halophyte for seawater irrigation. *Science*. March. 251: 1065-1067.

Popularization:
Glenn, E.P., J.J. Brown and J.W. O'Leary. 1998. Irrigating crops with seawater. *Scientific American*. August: 56-61.

Participants could be asked to complete a table like this:

1. What differences can you find between these two texts? Discuss with your neighbour.		
2. Now complete:	**Research article**	**Popularization**
2.1 Journal		
2.2 Title		
2.3 Audience		
2.4 Purpose of the genre		

3. Circle the appropriate answer:	Research article	Popularization
2.1 What is more important in the 'story' the writer is 'telling'?	a) science b) nature c) neither of the above	a) science b) nature c) neither of the above
2.2 What is the subject of this 'story'?	a) organisms (i.e. the plant or animal) b) experiments, actions scientists perform c) neither of the above	a) organisms (i.e. the plant or animal) b) experiments, actions scientists perform c) neither of the above
2.3 How is time arranged?	a) chronologically b) simultaneous events c) neither of the above	a) chronologically b) simultaneous events c) neither of the above
2.4 How do you rate the vocabulary and sentences?	a) as difficult as in the popularization b) more difficult than in the popularization c) less difficult than in the popularization	a) as difficult as in the research article b) more difficult than in the research article c) less difficult than in the research article

2. Comparing the same text with and without a particular discourse feature:

Task 2: Connectors - Reading two versions of the same text (one with and the other without connectors) and completing a table. (SS: group)

This task type has already been used in research (e.g. Spyridakis and Standal 1987; Mauranen 1993b: 163-168). In fact, this type of task in which two versions of the same texts are compared, can be useful pedagogically to highlight the difference in readability and clarity that the use or omission of connectors can produce. For this task I could either have chosen a text myself, and then deleted the connectors judged removable (as Mauranen 1993b did), or conversely I could have added connectors to the text selected (as Spyridakis and Standal 1987 did). Another possibility would have been to use one of the four expository texts Spyridakis and Standal (1987) used in their research, since their topics are appropriate for agriculture students. After reading the two versions of the text, participants could complete the following table and then discuss their answers:

1. What is(are) the main difference(s) between these two versions?
2. How do you perceive these texts? Circle the item that best expresses your view: 2.1 a) Version A is easier to read than version B. b) Version A is more difficult to read than version B. c) Version A is as difficult to read as version B. d) Unsure. 2.2 a) Version A is more logical than version B. b) Version A is less logical than version B. c) Version A is as logical as version B. d) Unsure. 2.3 a) Version A is more convincing than version B. b) Version A is less convincing than version B. c) Version A is as convincing as version B. d) Unsure. 2.4 a) Version A is more authoritative than version B. b) Version A is less authoritative than version B. c) Version A is as authoritative as version B. d) Unsure.

3. Evaluating the function of words:

Task 3: Discourse structuring words - Deciding whether the discourse structuring words used function as summary or as interpretation. (SS: pairs)

This task draws participants attention to the fact that discourse structuring words can sometimes 'be seen as being *interpretative*, or designed to persuade the reader how to "read" the previous sentence' (Swales and Feak 2000: 45) could be included. This task could be designed following the blueprint of a task in Swales and Feak (2000: 45):

Task 4: Which of the following discourse structuring words functions as **summary** and which as **interpretation**?		
The student said he wanted a laptop to do his fieldwork.		
	summary	**interpretation**
a. This *statement* surprised the supervisor.	______	______
b. This *request* surprised the supervisor.	______	______
c. This *hope* surprised the supervisor.	______	______
d. This *desire* surprised the supervisor.	______	______
e. This *demand* surprised the supervisor.	______	______
f. This *ultimatum* surprised the supervisor.	______	______

4. Comparing the style of two genres:

Task 4: Nominal style - Comparing two different genres dealing with the same topic – a research article and a popularization – written by the same researcher(s). Discussing of how styles are similar or differ. (SS: pairs)

For this task, participants could use the research article and popularisation already analysed in Task 1 (above) to complete the following table:

1. What differences or similarities can you find between these two texts? Discuss with your neighbour. (Remember the differences between genres discussed in Unit 1) • title • abstract/summary • illustrations/photographs/figures/tables/graphs etc.
2. What differences in style can you find between these two texts? Discuss with your neighbour.

Possible differences:	**Research article** **(give examples for your choices)**	**Popularization** **(give examples for your choices)**
2.1 **Vocabulary**: • technical/scientific/everyday • nominalisations • noun chains • verbs ('empty verbs'/more specific verbs)		
2.2 **Sentence complexity**: • complex sentences/ several more simple sentences • active voice / passive voice		
2.3 **Style**: • abstract/concrete • dense/loose or rambling		